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CULTURAL RESOURCES SURVEY IN THE ALVORD BASIN
SOUTHEASTERN OREGON

By

Richard M. Pettigrew

Final report of a reconnaissance survey conducted under United States Bureau of Land Management Contract No. YA-512-CT6-10. Submitted in fulfillment of agreement by C. Melvin Aikens, Associate Professor, Department of Anthropology, University of Oregon, Eugene, Oregon 97403.

C. Melvin Aikens
Supervising Archaeologist

November 15, 1975

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Introduction

This is a report of a reconnaissance for archaeological and historical sites undertaken by the Department of Anthropology, University of Oregon, under contract with the Bureau of Land Management. The area examined included 179-1/16 square miles of BLM land within the confines of the project area (see Map 1), located in the Mickey and Alvord Desert basins and the northern Pueblo Valley, Harney County, Oregon. The project was initiated September 1, 1975, upon receipt of Contract No. YA-512-CT6-10. Four steps were involved in conducting the project: 1) a literature search; 2) contact with knowledgeable persons; 3) a ground search; and 4) preparation of this final report.

The literature search included the reading of all available and relevant archaeological and historical literature concerned with the project area (see Bibliography), as well as examination of the archaeological site survey files at the Museum of Natural History, University of Oregon. The only source which contained information of any kind about relevant sites within the project area was Newman *et al*. (1975), the report of the first cultural resources survey of the area done in November and December, 1974. Some of the sites reported by Newman *et al*. were re-examined in the course of the ground search conducted by the present project, while others were outside the tracts chosen for sampling and were thus not re-examined.

Knowledgeable persons contacted about the archaeological and historical resources of the project area included Robert Sutton, the Oregon State Historic Preservation Officer; David L. Cole, Curator of Anthropology, University of Oregon; Dr. Thomas M. Newman, Department of Anthropology, Portland State University; Dr. C. Melvin Aikens, Associate Professor, Department of Anthropology, University of Oregon; and Joanne M. Mack, former Archaeological Survey Research Supervisor, Department of Anthropology, University of Oregon, who has conducted previous surveys in southeastern Oregon. None of these individuals, with the exception of Dr. Newman, knew of any historic or prehistoric sites within the project area, nor could they find any such information in their records. Dr. Newman, of course, having conducted the first survey in the area, knew of many sites, as recorded in the first survey report. All of these people provided information and suggestions which led to the creation of the research strategy employed in the survey of the project area.

The ground search was conducted from September 1st to the 21st by the author with a total crew of 10 persons, all students or recent graduates of the Department of Anthropology, University of Oregon. Dr. Michael D. Southard served as Field Assistant on the project. Two crew members worked only the first 10 days of the project and were replaced for the last 10 days by another set of two crew members. One

crew member sustained a minor injury during the first half of the field time, and was replaced for the second half. Half a man-day was lost due to illness of one crew member. The Supervising Archaeologist, Dr. C. Melvin Aikens, spent September 3 and 14 in the field. A total of 177½ man-days were spent on the ground search itself.

On the third of September Dr. Aikens chartered a small airplane and flew from Eugene to Denio, Nevada, to pick up the author and his assistant, for an aerial reconnaissance of the project area. On this occasion we also flew to Burns, to confer with Mr. Chris Vosler, District Manager of the Burns District Office. Mr. Vosler and Messrs. Jerry Heinz and Wilbert Bright, of his staff, generously gave us information and assistance for which we are very grateful. They provided us with necessary maps and loaned us aerial photographs of the project area for use during the ground search and preparation of the final report.

Setting

The Alvord project area is part of the Basin and Range Province, and occupies a graben with an interior drainage system. There are five basins into which all the streams in the area flow. These are Mickey Lake; an unnamed small basin with a dry playa bottom between Mickey Lake and the Alvord Desert; Manns Lake basin, only the southern portion of which is in the project area; the Alvord Desert basin itself, the largest of the five; and the basin in which Alvord Lake is situated, in Pueblo Valley. The last mentioned basin could perhaps be considered part of the Alvord Desert basin, since there is an intermittent stream, unnamed, which drains Alvord Lake into the Alvord Desert at high water (see Map 1). There are no true permanent streams in the BLM-owned portion of the project area, but at the time of the ground search, after an unusually wet summer, a few of the streams coming off Steens Mountain to the west were flowing down almost to the margin of the valley floor.

For purposes of analysis, the project area was divided into 7 zones on the basis of elevation, topography and the nature of the soil. These zonal divisions help to define the pattern of site distribution as found in the ground search and to predict where sites should tend to be found in the future. The distribution of the zones is shown in Map 2, and their definitions are as follows:

Zone 1: Flat, unvegetated, playa bottom, characterized by homogeneous lacustrine silt (Plate 1a). There are four major playas and numerous smaller ones. The major playas are Mickey Lake, with an elevation below 4000 feet; the unnamed playa just southwest of Mickey Hot Springs at an elevation between 4000 and 4100 feet; the Alvord Desert, elevation 4000 feet; and Alvord Lake, elevation about 4020 feet.

Zone 2: Playa bottom with randomly dispersed silt hillocks. A hillock is defined as a mound of lacustrine silt (Plate 1b). These hillocks are remnants of ancient lake bottom sediments which were deposited at a time before the present playas were formed and which have been mostly washed away by erosional runoff. The hillocks in this zone usually have their tops anchored by bunches of greasewood (Sarcobatus vermiculatus), and the playa bottom around them is usually unvegetated. This zone is generally associated with the edges of playas. Outside of the Mickey Lake basin the elevation of the zone varies from 4000 to 4030 feet. Around Mickey Lake the elevation dips below 4000 feet.

Zone 3: Dune and hillock topography (Plate 2a). This zone has been called 'dune and slough topography' by Wiede (1968:129). While Wiede's terminology may fit the situation better in Warner Valley (where she applied it), the present term was chosen because it seems to fit the Alvord project area more precisely. This is the zone in which sand dunes are found, though hillocks (as defined above) are also common. In this zone there are areas with only hillocks separated by erosional channels, and there are areas with only sand dunes and similar channels, but there are also areas which show an intergradation from simple hillocks, to hillocks with light sand mantles on their tops, to hillocks with thick sand mantles, to true dunes with silt foundations. Wherever there is sand, however, it is an overlay atop lacustrine sediments. In areas where they are both found, dunes are generally larger than hillocks, and are generally at higher elevation. Outside of the Mickey Lake basin, where the zone can be found at or below 4000 feet, it varies from 4025 to 4080 feet, though it dips down to 4000 feet in places. Hillocks and dunes are topped by greasewood predominantly, though sagebrush (Artemisia sp.) and rabbitbrush (Chrysothamnus nauseosus) are not uncommon.

Zone 4: Alkali Flats (Plate 2b). This area is associated with Borax Lake, and exists only in the southern portion of the project area. The zone is characterized by an alkaline crust on the ground surface and by smooth topography dissected by numerous erosional channels. Elevation varies from 4030 to 4065 feet and there is practically no vegetation except along stream channels.

Zone 5: Lower strands and terraces (Plate 3a). This is the area above the playas and below 4080 feet where there are few or no dunes or hillocks. There are often visible strand lines and/or lake terraces. Outside of the Mickey Lake basin this zone exists only on the west side of the valley, and in the Mickey Lake basin it extends down almost as low as the edge of the playa. The upper portion of the zone is dominated by sagebrush, while nearer the playa edge greasewood becomes more common.

Zone 6: Upper strands and terraces (Plate 3b). This area is defined by distinct parallel features recognizable as strand lines on all sides of the valley, and varies in elevation from 4080 to 4250

feet. Since in some areas all traces of strand lines have been erased, this zone is defined there only by elevation. On the east side of the project area the boundary between Zones 3 and 6 is very clear, while on the west side the absence of Zone 3 obscures this line. The lower portion of Zone 6 is characterized by loose sandy silt, changing gradually with increased elevation to a deflated gravel which is more characteristic of the upland area (Zone 7). The vegetation in Zone 6 is dominated by sagebrush.

Zone 7: Uplands (Plate 4). This is defined as the zone above 4250 feet. The surface generally consists of a deflated gravelly pavement, and stunted sagebrush dominates the vegetation.

Methodology

In accordance with the general specifications of the Bureau of Land Management, the Alvord Basin reconnaissance was designed to assess the cultural resources of the project area by sampling a significant portion of the lands contained within it. As a first step in the definition of a research strategy suited to the specific area, a search of the archaeological literature was undertaken, in order to find out to what degree of certainty one could predict where archaeologic sites would tend to be located. Publications consulted include Cressman, Williams, and Krieger (1940); Weide (1968); Butler (1970); Hester (1973); Fagan (1974); and Mack (1975). Of these authors, only Weide and Mack direct analysis toward the problem of aboriginal settlement pattern in an area comparable in size to the Alvord project area. Weide (1968) mentioned 11 kinds of sites for Warner Valley, 70 miles to the west of the Alvord region: 1) midden sites with some depth found at the mouths of permanent streams; 2) occupation sites, associated with dunes and sloughs; 3) spring sites; 4) sites on the edge of upland collapse lakes; 5) sites in upland meadows and swales; 6) lithic source and workshop sites; 7) sites associated with intermittent streams; 8) hunting blinds; 9) rockshelters and caves; 10) strand line sites; and 11) petroglyph sites. All of these kinds of sites could be expected within the project area but the first, since without exception the mouths of permanent streams are on land under private ownership and thus excluded from the investigation.

Mack (1975) concluded that the pattern of site distribution in her South Warner Valley project area fit well with Weide's criteria. She emphasized, however, that the area she surveyed was small, and that future surveys should continue to test the original assumptions about site distribution.

Even if we conclude that Weide's formula for site distribution fits well for Warner Valley, however, we are left with the problem of its applicability to the Alvord project area. There are some major

differences between the two areas which may result in significant differences in site distribution. First and foremost is the fact that Warner Valley has for a long time possessed large quantities of permanent water, and is a focus for plant and animal, and thus, human life. The Alvord project area, in contrast, is far more arid, with consequently smaller and less diversified plant and animal populations. Magnifying this difference is the fact that the land with good water sources in the area is in private hands, leaving only the driest areas for the BLM and the present survey project. Furthermore, even if we were to assume that the pattern of site distribution were the same as in Warner Valley, we could not control for the obvious environmental changes that have occurred in the last 10,000 years, turning the area from a vast lake-filled basin to a marshy valley with a chain of lakes and finally to dry playa bottomland surrounded by sand dunes. Human settlement patterns fit environmental patterns, and when the environment changes, so presumably do the settlement patterns.

Because of the degree of uncertainty about site distribution patterns in the project area, it was decided that both seemingly likely and seemingly not-so-likely places would have to be checked in the course of the ground search. A simple sampling scheme was designed to accomplish this. In the project area there are 199 sections in which the BLM holds land, for a total land area of 179-1/16 square miles (see Map 3). It was assumed at the beginning of the project that our crew of 10 people could cover about 5 sections per day, which would mean about 100 sections in the course of our 20 days in the project area. We therefore selected, using a random number table, 98 sections within the project area for coverage. After studying the distribution of these randomly selected sections on the map, we were satisfied that all types of terrain and environmental features were as well represented in the sample as they were in the project area as a whole. This procedure assures a statistically valid sample, from which valid inferences can be made about the whole of the project area.

We began our ground search in the northern part of the project area, in the Mickey Basin region. After 5 days of ground search, it became clear that we could in fact cover with adequate intensity only 3 sections per day, and it was thus necessary to withdraw 30 sections from the list of tracts to be surveyed. This was also done randomly, so as to protect the statistical validity of the sample. In addition to the 30 sections thus withdrawn, Section 22 in T. 36 S., R. 33 E., was inadvertently left out of the ground search because of a clerical error on the part of the author. However, since only one quarter of that section is BLM land, the error is of slight magnitude. All in all, then, BLM lands in 67 randomly selected sections were surveyed, encompassing a total land area of 61 square miles. This is approximately one-third of the total project area, and provides a good sample of the whole.

In addition to examination of the randomly selected sections, 20 man-days were allotted toward the end of the ground search in order to

survey areas outside the random sample where sites were strongly suspected. By this time we had developed some fairly confident hypotheses about site distribution patterns on the valley floor, where most of the sites in the project area are located. In the time allotted, 4 additional sections were covered in the southern portion of the project area. Thus, 71 sections or parts of sections, for a total land area of 65 square miles, were covered during the ground search phase of the project. The locations of these sections can be found on Map 3.

Results

A total of 224 prehistoric sites were found in the course of the ground search. Of these, 149 sites were found in the 67 randomly selected sections, 69 in the 4 sections intentionally selected, and 6 in sections adjacent to those intensively covered. The locations of the sites are marked on Maps 4 through 20, and standard data sheets prepared in the field for each are included in the Appendix. Table 1 summarizes the data from all 224 sites.

Because the majority of the sections surveyed were selected randomly, and because a significantly large sample was examined, it is possible to make statistical predictions of the number of sites present in the portion of the project area not covered in the ground search. To facilitate this, the surface area present in each of the seven environmental zones defined above has been computed, both for the total project area and for the randomly sampled portion of it. A site density figure is derived by dividing the number of sites found in the randomly sampled part of a given environmental zone by the actual land area covered. The site density, multiplied by the land area remaining in the unsurveyed portion of the given environmental zone, gives the predicted number of sites for that portion of the zone. The figures used in computing the site densities, the site densities themselves, and the predicted number of sites for unsurveyed areas are presented in Table 2.

As can be seen in Table 2, a significant proportion of most of the zones was covered in the ground search, and the resultant site density figures have a high degree of confidence associated with them. The one exception to this is Zone 4 (the Alkali Flats), in which only 3.3% of the entire area was covered. One site was found in that small area, giving a site density figure of 8.00 for the zone, which is undoubtedly far higher than the reality. Realistically, we can expect only a very low number of sites in Zone 4, although we cannot conclude that it is barren of sites.

The four sections selected non-randomly for coverage were picked because it was expected that more sites would be found in them than was average for the project area. It had been noticed in the

TABLE 1

SITE DATA, ALVORD BASIN SURVEY

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
101	32S	36E	17	spring	x	x	x		x	x		x		x			below 4000	1500 B.C.-historic
102	"	"	"	"	x	x	x			x							"	6000 B.C.-A.D. 1500
103	"	"	19	"	x					x							"	?
104	"	"	"	"	x	x				x							"	6000 B.C.-A.D. 1500
105	"	"	"	"	x	x	x	x		x							"	?
106	"	"	"	"	x					x							"	?
107	"	"	"	streamside	x	x		x									"	7500 B.C.-1000 B.C.
108	"	"	32	dune	x												"	?
109	33S	35E	24	open	x		x	x						x			4000-4080	?
110	"	"	22	hillock	x	?	x										4000-4100	5500-500 B.C.
111	"	34E	3	open	x												4600-4700	?
112	"	"	"	"	x	x											"	1000 B.C.-A.D. 1500
113	"	35E	28	"	x	x											4080-4100	6000-500 B.C.
114	"	"	"	"	x	x											"	6000-1000 B.C.
115	"	"	"	strand	x	x	x										4000-4080	?
116	"	"	"	dune	x												"	?
117	"	"	"	"	x	x	x	x									"	6000 B.C.-A.D. 1000
118	34S	"	22	"	x					?					x		"	?
119	"	"	"	"	x	x		x									"	?
120	35S	"	3	streamside	x												4000-4040	?
121	"	"	"	hillock	x	x											4000-4030	?
122	"	"	"	open	x												"	?
123	"	"	"	"	x	x	x										4000-4040	8500 B.C.-A.D. 1000
124	"	"	"	dune	x		x							x			"	?
125	35S	34E	17	rock shelter													4200	?

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
126	36S	33E	21	open	x			x									4060	?
127	"	"	"	"	x												4070-4080	?
128	"	"	"	"	x	x											4050-4060	6000 B.C.-A.D. 1000
129	"	"	20	cairn													4320	?
130	"	"	29	streamside	x												4800	?
131	"	"	"	open	x	x											4780-4800	?
132	"	"	"	spring	x				x	x				x			4560-4640	?
133	"	"	21	open	x	x							x				4060-4070	?
134	"	"	28	"	x		x	x									4060-4070	?
135	"	"	"	"		x											4050-4060	?
136	"	"	"	"	x	x											4050-4060	5500-500 B.C.
137	"	"	"	"	x	x											4040-4050	5500 B.C.-A.D. 1500
138	35S	34E	17	cairn													4200-4250	?
139	"	"	20	spring	x	x											4040-4050	6000 B.C.-A.D. 1000
140	"	"	"	"	x	x	x										4020-4050	5500-500 B.C.
141	"	"	30	open	x												4250-4280	?
142	"	"	"	"	x												4240-4250	?
143	36S	"	4	"	x	x		x									4010-4115	5500-500 B.C.
144	"	"	"	"	x												"	?
145	"	"	"	"	x												"	?
146	"	"	"	"	x	x											"	6000-1000 B.C.
147	"	"	"	hillock	x	x											"	6000 B.C.-A.D. 1000
148	"	"	"	"	x	x	x										"	6000 B.C.-A.D. 1500
149	"	"	"	"	x		x	x									"	?
150	"	"	"	"	x	x											"	6000 B.C.-A.D. 1000

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
151	36S	34E	18	hillock	x	x											4020-4025	6000-1000 B.C.
152	"	"	20	streamside	x	x											4015-4020	9000 B.C.-A.D. 1500
153	"	"	"	open	x	x											4015-4020	7500-6000 B.C.
154	"	"	"	hillock	x												4015-4020	?
155	"	"	30	"	x		x										4020-4025	?
156	"	"	"	"	x												4025-4030	?
157	"	"	"	"	x												4025-4030	?
158	"	"	"	"	x												4025-4030	?
159	"	"	"	"	x												4025-4030	?
160	"	"	"	"	x			x									4020-4025	?
161	"	"	"	"	x												4025-4030	?
162	"	"	"	"	x												4025-4030	?
163	"	"	28	"	x												4025-4030	?
164	"	"	"	dune	x												4025-4030	?
165	"	"	"	"	x												4030	?
166	"	"	"	hillock	x											x	4030-4040	9000-4500 B.C.
167	"	"	"	dune	x												4035-4040	9000-4500 B.C.
168	"	"	"	hillock	x												4035-4040	?
169	"	"	32	streamside	x												4030-4040	?
170	"	"	"	"	x												4030-4040	?
171	37S	33E	6	"	x	x	x										4400-4420	5500-500 B.C.
172	"	"	7	open	x												4360-4400	?
173	"	"	"	"	x												4360	?
174	"	"	19	"	x									x			4240	?
175	36S	34E	32	dune	x												4030	?

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface	Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
176	36S	34E	32	hillock	x												x	4030	9000-4500 B.C.
177	"	"	"	"	x													4030-4035	?
178	"	"	"	"	x	x												4035	9500-7500 B.C.
179	"	"	"	"	x													4035-4040	?
180	"	"	"	open	x	x	x											4040-4045	?
181	"	"	"	hillock	x													4035	?
182	"	"	"	"	x	x												4040	?
183	"	"	"	"	x													4035-4045	?
184	"	"	"	"	x			x										4040-4050	?
185	"	"	"	"	x													4040-4050	?
186	"	"	"	"	x	x		x										4040	?
187	"	"	"	open	x													4040-4050	?
188	"	"	"	streamside	x													4035-4040	?
189	"	"	"	hillock	x													4035-4040	?
190	"	"	"	open	x													4040	?
191	"	"	"	hillock	x													4040	?
192	"	"	"	"	x													4040	?
193	"	"	"	"	x			x										4040	?
194	"	"	"	"	x	x												4040-4045	6000 B.C.-A.D. 1000
195	"	"	"	spring	x	x												4040-4050	7500-6000 B.C.
196	"	"	"	"	x													4040-4050	?
197	"	"	"	open	x													4050	?
198	37S	"	6	hillock	x	x											x	4040-4045	9000-1000 B.C.
199	"	"	"	spring	x	x		x										4035-4040	6000 B.C.-A.D. 1000
200	"	"	"	hillock	x	x	x											4040-4050	8500-3000 B.C.

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
201	37S	34E	6	strand	x	x										x	4060	9000-4500 B.C., 500 B.C.-A.D. 1000
202	"	"	"	"	x												4030-4035	?
203	"	"	"	"	x			x									4030-4035	?
204	"	"	"	"	x	x											4030-4035	5500-500 B.C.
205	"	"	"	spring	x												4040	?
206	"	"	"	hillock	x												4040-4045	?
207	"	"	"	"	x												4040-4055	?
208	"	"	"	"	x												4045-4050	?
209	"	"	"	"	x												4045-4050	9000-500 B.C.
210	"	"	"	"	x												4050	?
211	"	"	"	open	x	x	x										4050	?
212	"	"	"	spring	x												4050	?
213	"	"	"	"	x	x	x							x		x	4055-4075	9000 B.C.-A.D. 1500
214	"	"	"	open	x	x			?					x	?		4050-4060	?
215	"	"	"	strand	x			x								x	4080	9000-4500 B.C.
216	"	"	"	open	x												4035-4040	?
217	"	"	"	spring	x		x										4040	?
218	"	"	"	"	x												4040-4045	?
219	"	"	"	hillock	x	x											4045-4050	5500 B.C.-A.D. 1500
220	"	"	"	"	x												4050	?
221	"	"	"	"	x												4050	?
222	"	"	"	open	x												4050-4065	?
223	"	"	"	"	x												4075-4080	?
224	"	"	"	hillock	x												4090-4100	?
225	"	"	"	spring	x	x	x										4040	6000-1000 B.C.

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
226	37S	34E	6	open	x		x										4035-4040	?
227	"	"	"	"	x	x											4035-4040	5500-500 B.C.
228	"	"	"	hillock	x												4040-4050	?
229	"	"	"	open	x												4040-4050	?
230	"	"	"	hillock	x												4060	?
231	"	"	"	strand	x												4070-4090	?
232	"	"	7	open	x		x	x									4035-4040	?
233	"	"	"	"	x												4040	?
234	"	"	"	"	x												4035-4040	?
235	"	"	"	spring	x	x											4040-4045	6000-500 B.C.
236	"	"	"	hillock	x		x										4050	?
237	"	"	"	"	x												4045	?
238	"	"	"	rockshelter	x												4200	?
239	"	"	"	open	x												4035-4040	?
240	"	"	"	strand	x			x									4160-4170	?
241	"	"	"	hillock	x												4040-4045	?
242	"	"	"	open	x		x										4045-4050	?
243	"	"	"	hillock	x			x									4050-4055	?
244	"	33E	15	dune	x	x											4055-4060	500 B.C.-A.D. 1500
245	"	"	"	"	x												4050	?
246	"	"	"	"	x												4050	?
247	"	"	"	"	x	x			x	x					x		4055-4060	9000-4500 B.C., 500 B.C.-A.D. 1500
248	"	"	"	"	x												4055-4060	?
249	"	"	"	"	x	x			x								4055-4050	?
250	"	"	"	"	x					?							4055-4060	?

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
251	37S	33E	15	dune	x												4060	?
252	"	"	"	"	x		x										4055-4060	?
253	"	"	"	"	x	x		x		x							4055-4065	?
254	"	"	"	"	x												4055-4060	?
255	"	"	"	"	x												4060	?
256	"	"	"	"	x												4060	?
257	"	"	"	"	x												4060	?
258	"	"	"	open	x												4070	?
259	"	"	13	"	x												4045-4050	?
260	"	"	"	"	x												4040-4045	?
261	"	"	"	"	x												4045	?
262	"	"	"	"	x	x											4035-4040	6000-500 B.C.
263	"	"	"	"	x					x							4040	?
264	"	"	"	"	x	x											4040-4045	5500-500 B.C.
265	"	"	"	hillock	x												4040-4045	?
266	"	"	"	open	x												4045	?
267	"	"	"	"	x												4040-4045	?
268	"	"	"	"	x												4040-4045	?
269	"	"	"	"	x												4040-4045	?
270	"	"	"	"	x	x											4040-4045	7500-6000 B.C.
271	"	"	"	hillock	x												4040-4045	?
272	"	"	"	streamside	x												4045	?
273	"	"	"	open	x	x					?	?					4045-4050	?
274	"	"	"	"	x												4045	?
275	"	"	"	streamside	x	x											4045	?

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
276	37S	33E	13	streamside	x												4045	?
277	"	"	"	open	x												4045	?
278	"	"	"	streamside	x		x										4045	?
279	"	"	"	open	x												4045-4050	?
280	"	"	"	"	x												4050	?
281	"	"	22	dune	x				x				x	x	?		4065-4070	?
282	"	34S	19	hillock	x												4075	?
283	"	"	"	open	x									x			4070	?
284	"	"	"	hillock	x	x											4065	6000-1000 B.C.
285	"	"	"	strand	x												4070	?
286	"	"	"	"	x									x			4070-4075	?
287	"	"	"	open	x									x			4070	?
288	"	"	"	"	x	x								x			4075-4080	500 B.C.-A.D. 1500
289	"	33E	27	hillock	x		x	x									4070-4080	?
290	"	"	"	"	x	x	x						x	x			4070-4080	6000-1000 B.C.
291	"	"	"	dune	x	x		x									4075-4080	500 B.C.-A.D. 1500
292	"	"	"	hillock	x	x											4075-4080	?
293	"	"	"	dune	x			x									4065-4075	?
294	"	"	"	"	x												4075-4080	?
295	"	"	"	"	x	x											4070-4080	500 B.C.-A.D. 1500
296	"	"	"	"	x												4070-4080	?
297	"	"	26	open	x	x											4055-4060	500 B.C.-A.D. 1500
298	"	"	"	hillock	x		x										4055-4060	?
299	"	"	"	open	x												4055-4060	?
300	"	"	"	"	x												4055-4060	?

TABLE 1--Continued

Site No. 35 HA	T.	R.	Sec.	Type of Site	Flakes	Proj. Pt.	Biface	Uniface	Mano	Metate	Uniface Cobble	Biface Cobble	Hammer-stone	Core	Hearth	Crescent	Elevation (ft.)	Inferred Date
301	37S	33E	26	open	x												4060	?
302	"	"	"	dune	x												4060	?
303	"	"	"	hillock	x												4060-4065	?
304	"	"	"	dune	x	x											4060-4070	7500-500 B.C.
305	"	"	"	"	x												4065-4070	?
306	"	"	"	"	x												4065-4070	?
307	"	"	"	"	x												4060-4070	?
308	"	"	"	"	x												4065-4070	?
309	"	"	"	open	x												4060-4065	?
310	"	"	"	streamside	x	x											4055-4060	?
311	"	"	"	"	x												4060-4065	?
312	"	34E	30	rockshelter													4250	?
313	"	33E	35	dune	x	x											4065	?
314	"	"	"	open	x	x											4065	500 B.C.-A.D. 1500
315	"	"	"	"	x		x										4065-4070	?
316	"	"	"	"	x												4065-4070	?
317	"	"	"	"	x												4065-4070	?
318	"	"	"	"	x	x											4065-4070	?
319	"	"	"	"	x		x										4065-4070	?
320	"	"	"	"	x												4065-4070	?
321	"	"	"	"	x	x											4065-4070	?
322	"	"	"	streamside	x												4065	?
323	"	"	26	dune	x												4060	?
324	36S	34E	32	open	x												4030-4035	?

TABLE 2

SITE DENSITIES AND SITE FREQUENCY PREDICTIONS, ALVORD PROJECT AREA ENVIRONMENTAL ZONES

Zone	Amt. in Project Area (sq. mi.)	Randomly Sampled Area (sq. mi.)	% of Area Covered	Number of Sites	Site Density (Sites/sq. mi)	Area Not Randomly Sampled	Predicted # of Sites in Area Not Not Randomly Sampled
1	37.9375	17.625	44.8	0	0	20.3125	0
2	15.8125	5.0	31.6	11	2.20	10.8125	24
3	42.5	11.625	27.4	104	8.94	30.875	276
4	3.8125	0.125	3.3	1	8.00	3.6825	30
5	6.9375	1.4375	20.7	12	8.35	5.5	46
6	30.8125	9.75	31.6	6	0.62	21.0625	13
7	32.5	12.875	39.6	9	0.70	19.625	14
5&6*	8.75	2.5625	30.0	6	2.34	6.1875	14
TOTAL	179.0625	61.0	33.5	149	2.44 (avg.)	118.0625	427

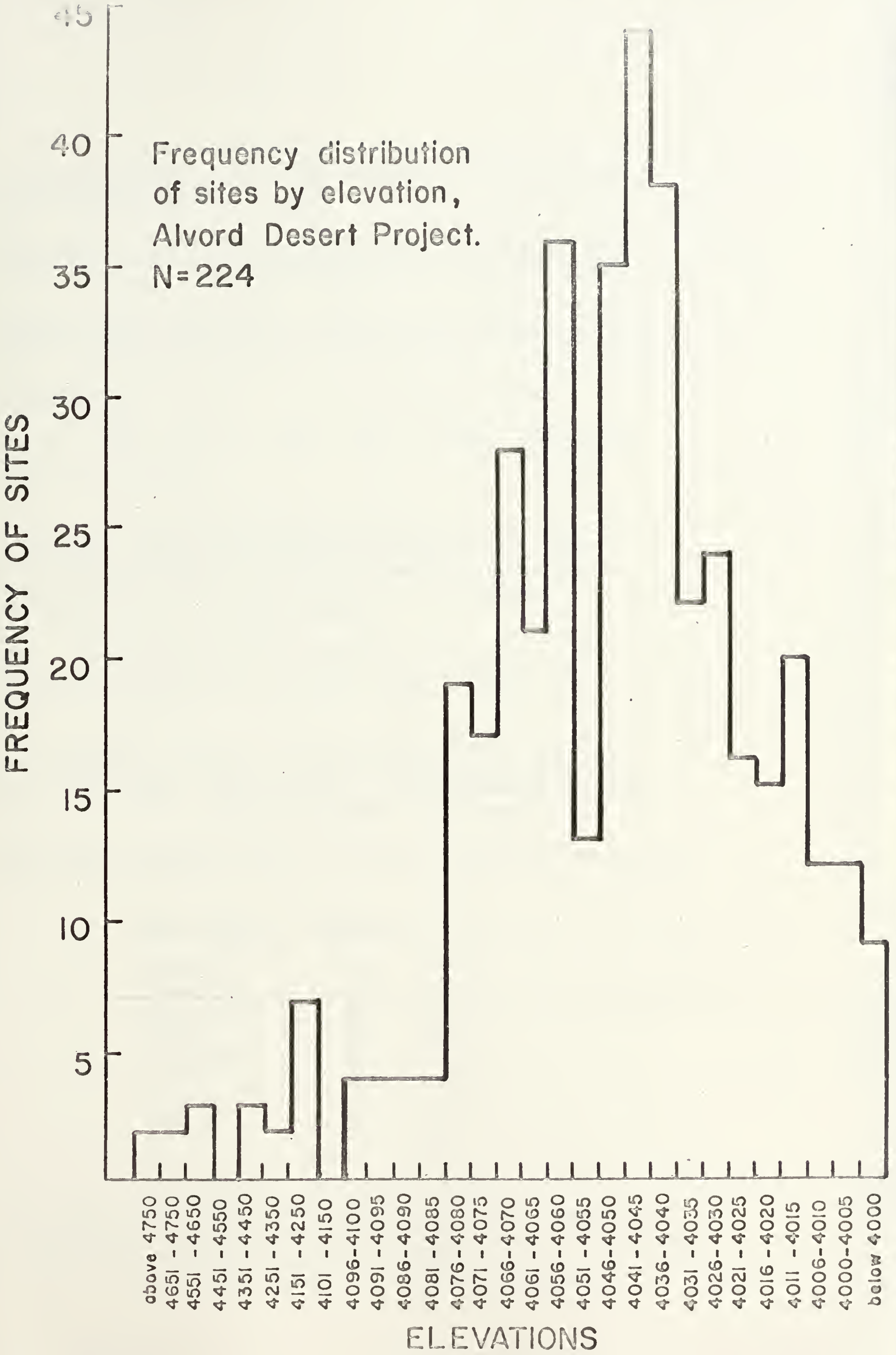
*undifferentiated area

course of the previous ground search that high site densities were found near good water sources, and that many sites had been found at elevations between 4035 and 4100 feet. The four sections examined satisfied either or both of these criteria. These were sections 15 and 27, T. 37 S., R. 33 E.; and sections 6 and 7, T. 37 S., R. 34 E. Of the 4 square miles represented 2.75 were in Zone 3, 0.375 in Zone 4, 0.1875 in Zone 5, 0.5625 in Zone 6, and 0.125 in Zone 7. No sites were found in Zones 4, 5, or 7, a not unexpected result in view of the small areas represented. Only in Zones 3 and 6 were sites found, 64 in Zone 3 and 5 in Zone 6, for a total of 69 sites. Using the average zonal site densities for the whole project area, one would have predicted 25 sites in Zone 3 and 0 in Zone 6, so, as expected due to the special circumstances noted above, the site densities in the non-randomly selected sections were considerably higher than the averages for the project area.

It had been conjectured at the outset that sites found in the project area might display a significant distributional pattern with respect to elevation. Assuming that the area was occupied during times when the valley was filled by a lake or lakes, it would be likely that sites might be distributed along old lakeshores, a pattern which would be confirmed if sites paralleled particular elevational contours on the map, or if sites tended to cluster at particular elevations on a site frequency vs. elevation graph. This expectation seems to have been confirmed. On the maps (see especially sections 28, 30 and 32, T. 36 S., R. 34 E.; sections 6, 7 and 19, T. 37 S., R. 34 E.; and sections 13, 15, 26, 27, and 35, T. 37 S., R. 33 E.; these sections are illustrated in Maps 13 through 18) one can see bands of sites at elevations 4025-4030, 4035-4050, 4055-4060, and 4065-4080. These same elevational clusters can be found in the following site frequency vs. elevation graph. In reading this bar graph, it is important to keep in mind that many sites were spread out over several elevational intervals, and it was thus necessary to add one unit to each elevational interval over which a site was spread. Totalling the frequencies for all the intervals would then result in a number much higher than the 224 actual sites. Nevertheless, a pattern generally similar to that seen on the map emerges from the frequency graph. Sites above 4150 feet are clearly in the minority, and are distributed separately from those below 4100 feet. Of the latter group, two major subgroups can be isolated: those above 4055 and those below 4050 feet. The densest cluster is that between 4036 and 4050 feet. A significant drop in site frequency comes at 4080 feet, an elevation which marks the lower boundary of Zone 6.

Eight types of sites have been defined for the Alvord project area. These were defined for descriptive purposes primarily, but it was also hoped that the kinds of artifacts found at the sites would display a pattern with respect to the site types. As we shall see, this hope was only partly realized. The site types are as follows:

Spring Sites: Sites clearly associated with, and adjacent to, springs.


Frequency distribution of sites by elevation, Alvord Desert Project. N=224

Streamside Sites: Sites within 40 meters of permanent or intermittent streams.

Dune Sites: Sites associated with true sand dunes. These sites are either on the dunes themselves or in the eroded areas adjacent to or between them.

Hillock Sites: These sites bear the same relationship to hillocks as dune sites do to dunes.

Rockshelter: Sites within rock overhangs or caves.

Cairn: These sites are simply piles of rocks. Those found in the ground search could be either aboriginal or Euro-American in origin.

Strand: Sites associated with ancient beaches as seen on the ground. There are undoubtedly many more sites not categorized as such which were originally associated with lake shores, but were not obviously on beach lines as recognized during the ground search.

Open: These sites are those located in the open and not associated with springs, streams, dunes, hillocks, or strands.

These site types were defined after the ground search phase of the project was completed, and do not necessarily correlate with the information listed under 'Type of Site' in the standard data sheets (filled out in the field) that are included in the Appendix.

The frequency of each type of site among those found during the ground search is as follows:

Type of Site	Frequency	%
Spring	19	8.5
Streamside	15	6.7
Dune	38	16.9
Hillock	60	26.8
Rockshelter	3	1.3
Cairn	2	0.9
Strand	10	4.5
Open	77	34.4
Total	224	100.0

For the most part, there is no clear relationship between the kinds of artifacts found at the sites and the type of site. At all types of sites flaked stone tools such as projectile points, bifaces, unifaces, crescents, and cores are found, as well as, in lesser frequency,

unifacially and bifacially flaked cobbles, hammerstones, and fire-cracked rock. One significant relationship does appear, however. Manos and/or metates occur at 12 sites, 7 of which are spring sites, 4 dune sites, and 1 an open site. This means that manos and metates are associated to a great degree with spring sites, and, to a much lesser extent, with dune sites. This result differs from that derived by Weide (1968) for Warner Valley, where she found that manos and metates were associated with her 'dune and slough' sites more than with any other kind of site. Moreover, it appears that manos and metates are far less common in the Alvord project area than they are in the portion of Warner Valley surveyed by Weide.

Chronology

Chronological estimates for the sites found in the project area can be based only on diagnostic artifact types for which ages have been determined elsewhere through radiocarbon dating. Three major publications in which Great Basin chronological indicators are summarized and discussed were consulted in order to provide the basis on which the Alvord project sites are temporally classified. These publications are Aikens (1970), Fagan (1974) and Hester (1973). Great Basin archaeologists do not always agree about the temporal placement of diagnostic artifacts, so it was necessary to make judgments in several cases among the various opinions. The date estimates arrived at for the 14 diagnostic artifact types found in the project area are these:

1. Fluted points: 9500-7500 B.C. (Plate 5:a-e)
2. Haskett/Lake Mohave points: 10,000-6000 B.C. (Plate 5:f-g)
3. Crescents: 9000-4500 B.C. (Plate 12:j-s and Plate 13:a-n)
4. Lind Coulee/Windust points: 8500-6000 B.C. (Plate 5:h-l)
5. Leaf-shaped points: 8000-3000 B.C. (Plate 6: a-c)
6. Plano (Scottsbluff, Alberta, Eden, broad-based) points: 7500-6000 B.C. (Plate 6:d-m)
7. Elko Eared: 6000-1000 B.C. (Plate 7:a-s)
8. Bitterroot Side-notched: 6000-1000 B.C. (Plate 8:a-l)
9. Pinto series points: 6000-500 B.C. (Plate 9: a-r)
10. Humboldt Base-notched or Concave Base points: 5500-500 B.C. (Plate 11:a-v and Plate 12:a-i)
11. Elke Corner-notched points: 6000 B.C.-A.D. 1000 (Plate 10:a-w)
12. Eastgate Expanding Stem points: 500 B.C.-A.D. 1500 (Plate 13:o-t)

13. Rose Spring Corner-notched points: 500 B.C.-A.D. 1500 (Plate 14:a-u and Plate 15:a-t)
14. Desert Side-notched points: A.D. 500-historic (Plate 8:n-q)

Only diagnostic artifact specimens were collected from the sites located. Of the 224 sites found only 55 of them presented such specimens to the ground search crew. These 55 sites, along with the frequency of diagnostic specimens collected and the inferred date for each site, are listed in Table 3.

Artifacts

Of the 211 diagnostic and classifiable artifacts collected in the survey, 109 were found at sites and 102 were isolated finds. All specimens complete enough to have interpretative value are illustrated in Plates 5-15. Because the collection includes most of the point types which have been described in the Great Basin, and represents a continuous record of habitation in the Alvord region from 10,000 B.C. to the present, it makes the Alvord region one of the major localities in Great Basin archaeology. The collection is very similar to that described by Butler (1970) for adjacent Coyote Lake basin, but takes on even greater usefulness because of detailed locational data which have been preserved.

Most of the diagnostic artifacts collected in the course of the survey are middle and late period (6000 B.C.-historic) types, which are common in Great Basin archaeology. A significant number of specimens, however, are early types, dating from 10,000-6000 B.C., some of which should be described in greater detail.

There are 5 unstemmed fluted points in the collection (Plate 5: a-e). All 5 are basal fragments, all made of obsidian, and show edge grinding. Only one specimen appears to have flutes which would carry along most of the length of the specimen. This has been tentatively classified as a large Folsom point (Plate 5:e). The remaining four appear to have shorter flutes and are thus more similar to the Clovis type.

There are 2 specimens which appear to fit into a class with Haskett and Lake Mohave points (Plate 5:f-g). Both are basal fragments, one is of obsidian and the other of a cryptocrystalline silicate.

There are 24 crescents in the collection, only 3 of which are of obsidian, the rest being of cryptocrystalline silicate (Plate 12:j-s and Plate 13:a-n).

Six specimens are identified tentatively as resembling Scottsbluff points (Plate 6:f-k). They are all basal or stem fragments and

TABLE 3

DISTRIBUTION OF DIAGNOSTIC ARTIFACTS AND INFERRED DATES, ALVORD PROJECT SITES

Site No.	Fluted points	Haskett/Lake Mohave	Crescents	Lind Coulee/Windust	Leaf-shaped points	Plano types	Elko Eared	Bitterroot side-notched	Pinto series	Humboldt series	Elko corner-notched	Eastgate Exp. Stem	Rose Spring Corner-notched	Desert Side-notched	Inferred Date Range
101							1				2		9	1	1500 B.C.-historic
102									1				1		6000 B.C.-A.D. 1500
104									1	1	1		1		6000 B.C.-A.D. 1500
107						2	2	1			2				7500-1000 B.C.
110										1					5500-500 B.C.
112											3		2		1000 B.C.-A.D. 1500
113									1						6000-500 B.C.
114							1								6000-1000 B.C.
117											1				6000 B.C.-A.D. 1000
123				1							1				8500 B.C.-A.D. 1000
128							1	1			1				6000 B.C.-A.D. 1000
136										1					5500-500 B.C.
137										1		1			5500 B.C.-A.D. 1500
139											1				6000 B.C.-A.D. 1000
140										1					5500-500 B.C.
143										1					5500-500 B.C.
146							1								6000-1000 B.C.
147								1				1			6000 B.C.-A.D. 1000
148												1	1		6000 B.C.-A.D. 1500
150				1						1					6000 B.C.-A.D. 1000
151							1								6000-1000 B.C.
152			1						1	1			1		9000 B.C.-A.D. 1500
153						1									7500-6000 B.C.
166			1												9000-4500 B.C.
167			1												9000-4500 B.C.
171										1					5500-500 B.C.
176			2												9000-4500 B.C.
178	1														9500-7500 B.C.
194												1			6000 B.C.-A.D. 1000
195						1									7500-6000 B.C.
198			2				1								9000-1000 B.C.
199												1			6000 B.C.-A.D. 1000
200				1*											8500-3000 B.C.
201			1										2		9000-4500 B.C., 500 B.C.-A.D. 1500

TABLE 3--Continued

Site No.	Fluted points	Haskett/Lake Mohave	Crescents	Lind Coulee/Windust	Leaf-shaped points	Plano types	Elko Eared	Bitterroot side-notched	Pinto series	Humboldt series	Elko corner-notched	Eastgate Exp. Stem	Rose Spring Corner-notched	Desert Side-notched	Inferred Date Range
204										1					5500-500 B.C.
209			1							1					9000-500 B.C.
213			1				1		1				1		9000 B.C.-A.D. 1500
215			1												9000-4500 B.C.
219										1			1		5500 B.C.-A.D. 1500
225							1								6000-1000 B.C.
227										2					5500-500 B.C.
235									2						6000-500 B.C.
244													1		500 B.C.-A.D. 1500
247			1									1	1		9000-4500 B.C., 500 B.C.-A.D. 1500
262									1						6000-500 B.C.
264										1					5500-500 B.C.
270						1									7500-6000 B.C.
284							1								6000-1000 B.C.
288													1		500 B.C.-A.D. 1500
290							1								6000-1000 B.C.
291												1			500 B.C.-A.D. 1500
295													2		500 B.C.-A.D. 1500
297													1		500 B.C.-A.D. 1500
304						1				1					7500-500 B.C.
314													2		500 B.C.-A.D. 1500

*could also be Leaf-shaped

are classed as Scottsbluff because of the squared nature of the base. It is possible, however, that they are basal sections of broad-based unstemmed points. One is of cryptocrystalline silicate, the others obsidian.

One specimen is a basal section of an obsidian broad-stemmed, shouldered point whose stem has been fluted (Plate 6:d). It has been tentatively classed as an Alberta point, the type which resembles it most closely.

One specimen has been classed as an Eden point because of its long parallel sides (Plate 6:e). It is, however, only a midsection fragment, made of cryptocrystalline silicate.

Two specimens are classed only as broad stems or bases (Plate 6: l-m). Both are of obsidian and, while it is not possible to classify them by type, they would seem to fit into a general Plano category.

There are 4 specimens classified as Lind Coulee points. Two of them, both basal sections, would seem to fit Daugherty's (1956) style 1 (Plate 5:i-j) and two would fit his style 2 (Plate 5:k-l). Of these four specimens, 2 are obsidian and 2 are ignimbrite. Besides these, there is one specimen (Plate 6:a) of obsidian, which could either be the stem of a style 2 Lind Coulee point or the base of a leaf-shaped point.

One complete specimen, of fine-grained basalt, fits most closely what has come to be called the Windust point type (Plate 5:h). It could certainly fit well into the series of points described by Rice (1972) for the Windust Phase on the Lower Snake River, with its broad, concave-based stem and asymmetric shoulders.

There are 2 specimens, both of obsidian and both missing their tips, which fit into the leaf-shaped category (Plate 6:b-c). Both fit well into the series described by Cowles (1960) for Cougar Mountain Cave northeast of Fort Rock Valley.

As mentioned above, one of the expectations held in mind at the outset of the project was that clusters of sites along ancient beach lines might be discernible. A corollary expectation was that by plotting the distribution of dated diagnostic artifacts versus elevation it might be possible to estimate the ages of the various beach lines and to describe the temporal sequence in which the lake dried up. This expectation has been partially realized as can be seen by viewing Table 4, which shows the frequency distribution of diagnostic artifact types by elevation.

As in the graph on page 18, it must be kept in mind when reading Table 4 that the elevation of any one site or area from which an artifact came lies within a range that may encompass more than one elevational interval, and thus if one were to total the frequencies all together one would arrive at a figure larger than the number of artifacts used in constructing the table. The pattern which emerges appears to show that the level of the Alvord Basin's lake dropped below 4050 feet after the time when fluted points were in use. The fluted points cluster between 4060 and 4070 feet, although there is one specimen found in the 4031-4035 interval. Also of note is the fact that the Haskett/Lake Mohave specimens cluster similarly to the fluted points, an expected situation since the two types are roughly contemporaneous. The Lind Coulee-Windust points cluster between 4021 and 4030 feet, which could indicate that the lake had already dropped

TABLE 4

DISTRIBUTION OF DIAGNOSTIC ARTIFACT TYPES
VERSUS ELEVATION, ALVORD PROJECT AREA

Elevation	Desert Side-notched	Rose Spring Corner-notched	Eastgate Exp. Stem	Elko Corner-notched	Humboldt series	Pinto series	Bitterroot Side-notched	Elko Eared	Leaf-shaped	Plano	Lind Coulee/ Windust	Crescent	Haskett/Lake Mohave	Fluted
above 4750		1										1		
4651-4750		3		3								1		
4551-4650		3		3										
4451-4550		2												
4351-4450		3	1		1		1							
4251-4350		4	1		1		1							
4201-4250		2			1									
4151-4200		2			2	1		1	1					
4101-4150	1	2	1	1	2	2	1		1					
4096-4100		1		2	4	4	1	3		1			1	1
4091-4095		1		2	4	4	1	3		1			1	1
4085-4090		1		2	4	4	1	3		1			1	1
4081-4085		1		2	4	4	1	3		1			1	1
4076-4080		3	1	2	4	3	1	3		1		1	1	1
4071-4075		3		2	4	6	1	4		1		1	1	2
4066-4070	1	2		2	6	9	1	3	1	2		1	2	3
4061-4065	1	3		2	6	9	1	4	1	2		1	2	3
4056-4060	1	6	1	3	6	6	2	4	1	1		3	2	2
4051-4055	1	1		3	4	5	2	3	1					2
4046-4050	3	4	1	5	8	6	2	3	2	2		2		1
4041-4045	3	3	1	6	8	8	2	4	2	4		5		
4036-4040	2	2		6	11	6	2	3		2		6		
4031-4035	1	2		4	8	6	1	2		2		4		1
4026-4030	1	3		5	5	3		2		2	3	7		
4021-4025	1	2		5	4	3	2	3		2	3	5		
4016-4020		2		3	4	3		1		1		3		
4011-4015		2		5	7		5	1			1			
4006-4010				2	2									
4000-4005				2	2									
below 4000	1	11	1	5	2	2	1	3		2				

below that level before 6000 B.C. Also of note are the crescents and Plano points, both of which display broad distributions from 4016 feet upward. This again would seem to indicate that the lake level dropped below 4020 feet somewhere between 8500 and 6000 B.C. Most of the rest of the types, with the exception of the leaf-shaped ones, are distributed down to and below 4000 feet, although only the Rose Spring Corner-notched type exists below 4000 feet in high frequency.

Another interesting result is that the early types are generally absent from elevations above 4100 feet, these elevations being dominated by late type points, especially the Rose Spring Corner-notched. This would seem to denote a tendency toward increasing utilization of the uplands by the more recent inhabitants of the area, especially after about 1000 B.C.

Conclusion

Without question the data gathered during the Alvord project survey represent a major step toward understanding the prehistory of human habitation in the northern Great Basin in the last 12,000 years. The application of a random sampling scheme to an area the size of the Alvord project has made possible the gathering of distributional data which would otherwise be inaccessible. As a result, we can now predict with a fair degree of accuracy where sites tend to be located in this basin, and need not rely on studies made elsewhere where environmental constraints are different, and where, as shown by the present study, site distributional patterns can differ.

One proviso must be made, however, with regard the the applicability of the present study to site distribution in the Alvord Desert region. Since BLM land in the area is not randomly distributed, we cannot reasonably expect that the site pattern on BLM land will be duplicated elsewhere. This point becomes especially clear when it is seen how truly biased the BLM land holdings are with regard to important environmental features. More particularly, most of the well-watered land, especially the land on the west side of the valley which receives runoff from Steens Mountain, is under private ownership. It is here where one should presumably find the highest site density in the whole valley, and where winter village sites such as Weide (1968) describes for Warner Valley should be located.

The data presented in this report have been analyzed to a certain degree, and the results of the analysis presented here. However, much more can be done with the information gathered in the survey. For example, the distribution of diagnostic artifact types according to elevation could be made more meaningful and the patterns more clearly delineated if the frequencies were normed according to how much area within each of the elevational intervals was actually surveyed. Also, changes in settlement patterns through time might be

discerned if sites were grouped by age and then plotted according to elevation, environmental zone, or other environmental features. Besides this, one could plot the distribution of isolated artifacts according to environmental zone in order to find out if their distribution differs from that of the sites, according to some hypothetical pattern of artifact use different from the pattern of site distribution. These kinds of analyses could not be completed for inclusion in this report because of a time deadline. They represent potential knowledge yet to be gained from the data of the survey.

Recommendations for Future Management

It is difficult to recommend one Alvord Basin site over another for nomination to the National Register of Historic Places. All sites, whether large or small, surface or stratified, old or recent, can yield data important to the decipherment of the archaeological record. Archaeological sites are like words in a sentence: who is to say which words should be preserved and which ones could be allowed to be erased while still preserving the meaning of the whole? All the sites in the Alvord project area are important in this sense, and all could be nominated to the National Register if that were practical. If a final judgment needed to be made about which sites were more important than others, such a decision should be made after an intensive surface collection program, as described further below. At the present stage of investigation, no sites are recommended for nomination to the National Register.

None of the sections covered in the survey are recommended for total withdrawal from proposed geothermal leasing operations. In most cases it should be possible to locate geothermal developments so as to avoid archaeological sites. In areas of demonstrated or predicted high site density, of course, the problem of avoidance could become critical, so that as a practical matter it might be better to simply avoid such areas if reasonable alternative geothermal locations exist.

It is recommended that in all cases of proposed development, a professional archaeologist be retained to closely examine the specifically delimited geothermal sites and access routes well in advance of any proposed construction. Appropriate measures for avoidance or mitigation could be determined at that time.

A major threat to the archaeological data of the region is the artifact collecting activity carried on by members of the public. It is clear that such collecting has already lessened somewhat the value of the area archaeologically. With increased public utilization of the Alvord Basin, this collecting activity will increase in intensity, and in a relatively short time render the area nearly useless from an archaeological point of view.

It is recommended therefore that sufficient provision for adequate enforcement of existing federal legislation protecting antiquities be made, or, failing that, that an intensive archaeological study program be instituted to salvage the important prehistory of the region before it is irrevocably lost to hobbyist collectors. An appropriate program would be as follows:

1. A significant sample of each type of site located in each of the environmental zones defined should be selected randomly for intensive surface collection and spatial analysis, as well as for test excavation if there is any depth to the cultural deposit. Test excavation would enable analysis of intra-site as well as inter-site relationships. The total sample should include approximately 90 sites and the investigation would involve an estimated 360 man-days in the field.

2. A significant sample of those sites which contain buried cultural deposits, if such can be shown to exist in the area by means of test excavation, should be extensively excavated in order to obtain large samples of well-dated cultural debris, especially diagnostic artifacts, which could be used to compare with undated collections made at surface sites. There are a number of sites in the project area which may have buried cultural deposits. These include sites 35 HA 101, 102, 103, 104, 105, 106, 132, 139, 140, 184, 195, 196, 199, 205, 212, 213, 217, 218, 225, 231, 235, and 253. Extensive excavation of a stratified site might require up to 150 man-days. A simple test excavation might require no more than about 15 man-days.

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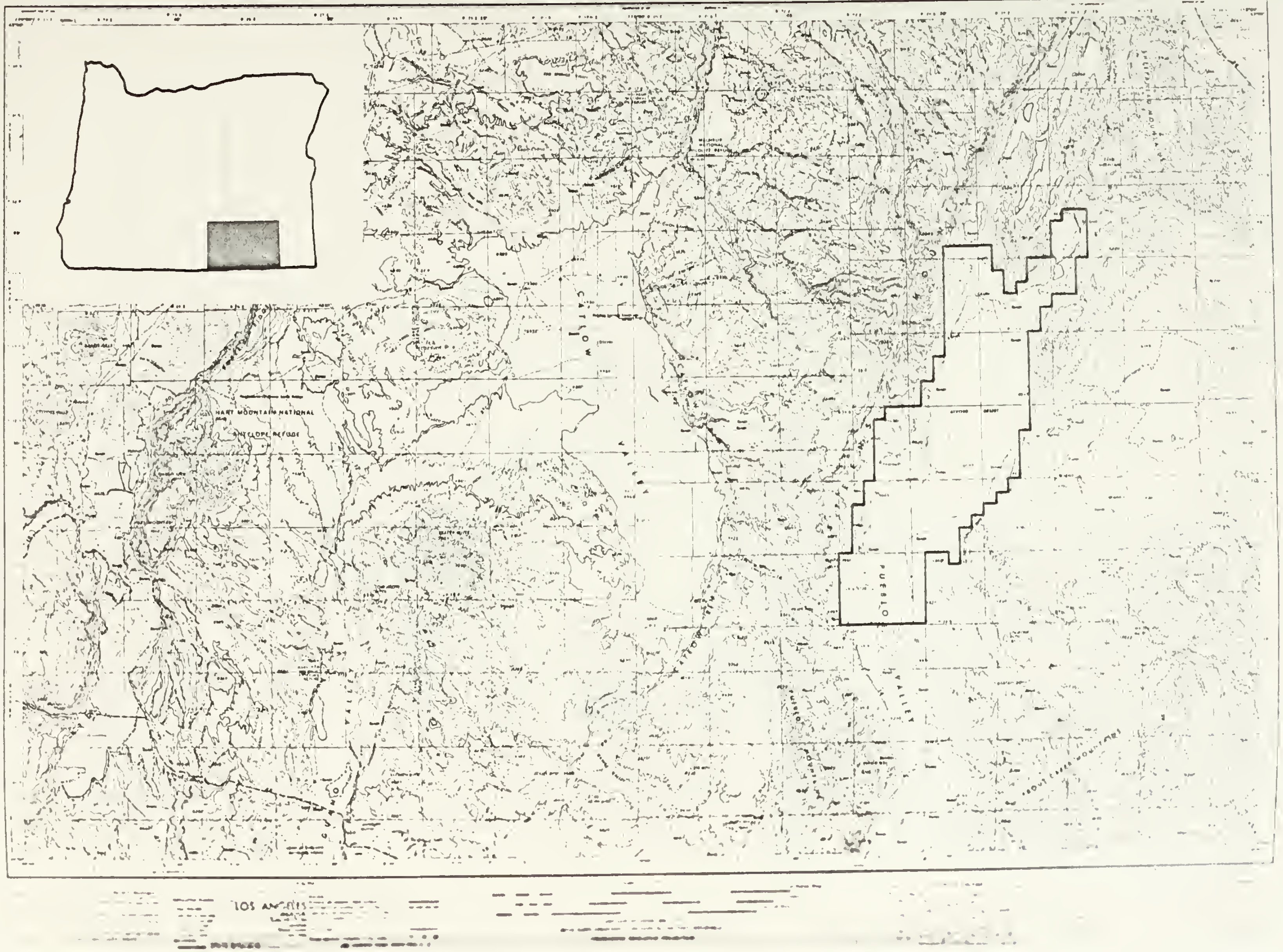
MAPS

MAP 1. PROJECT AREA (ADEL 60' X 30' QUADRANGLE, USGS)

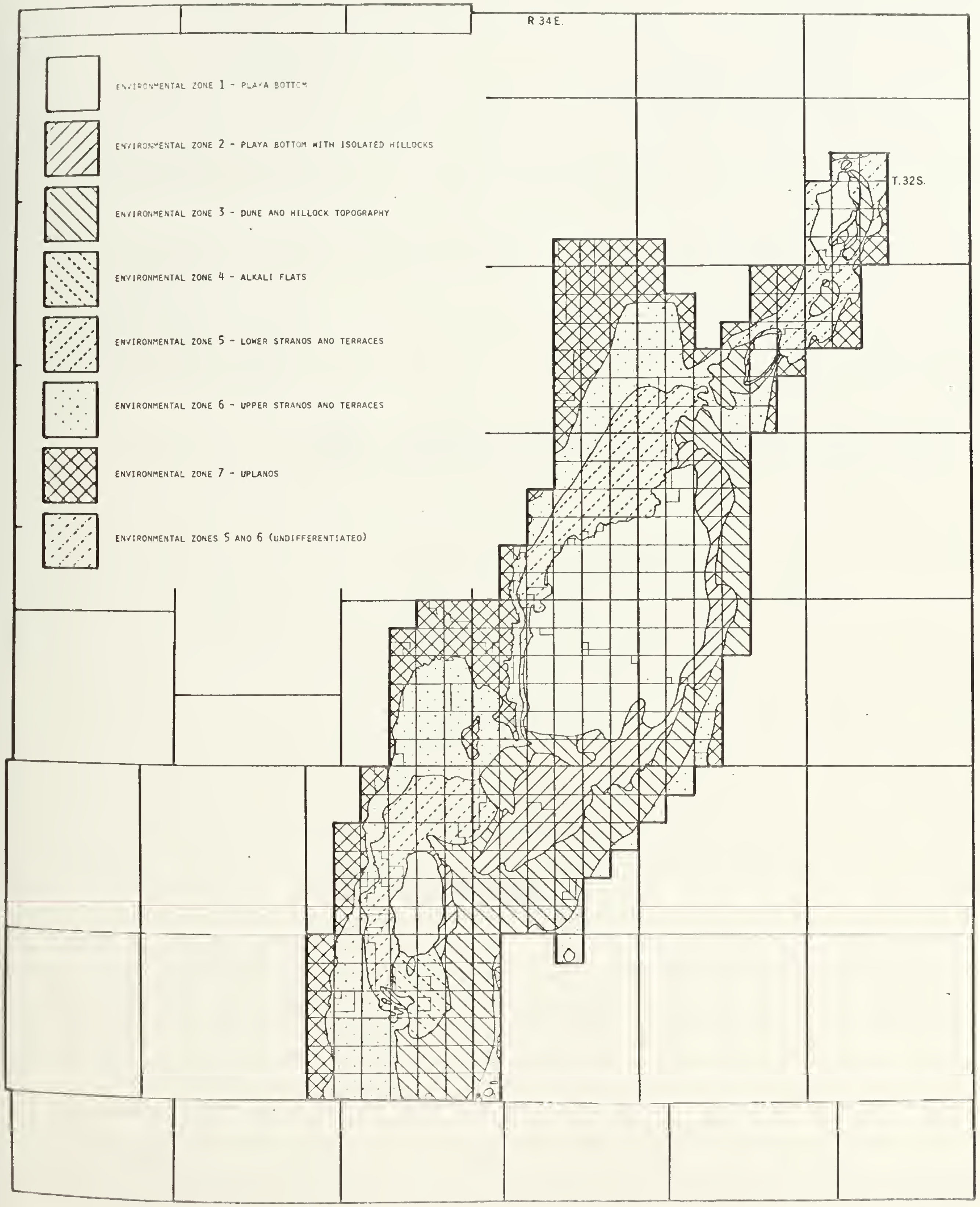
WESTERN UNITED STATES 1:250,000

ADEL

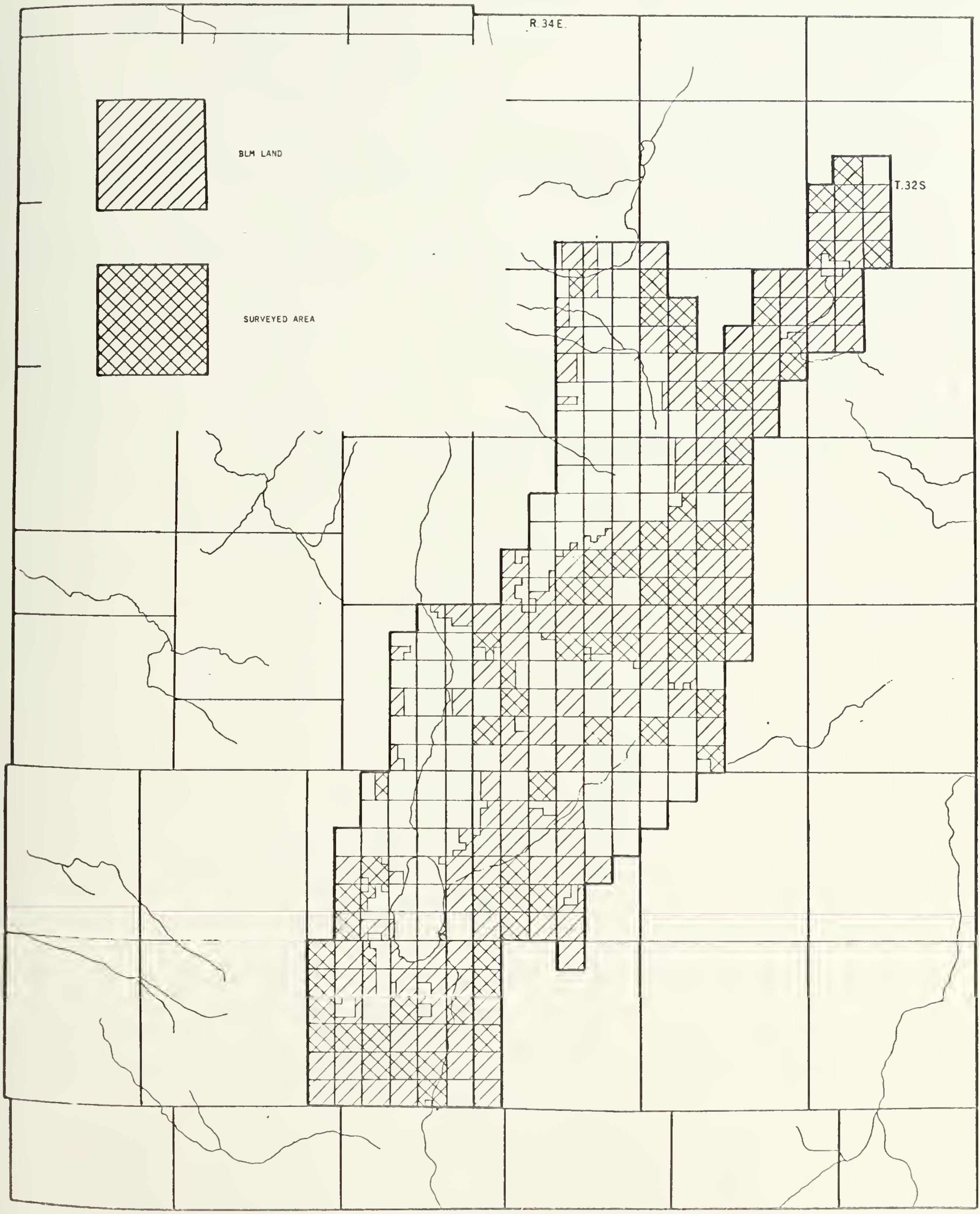
NK 11-4



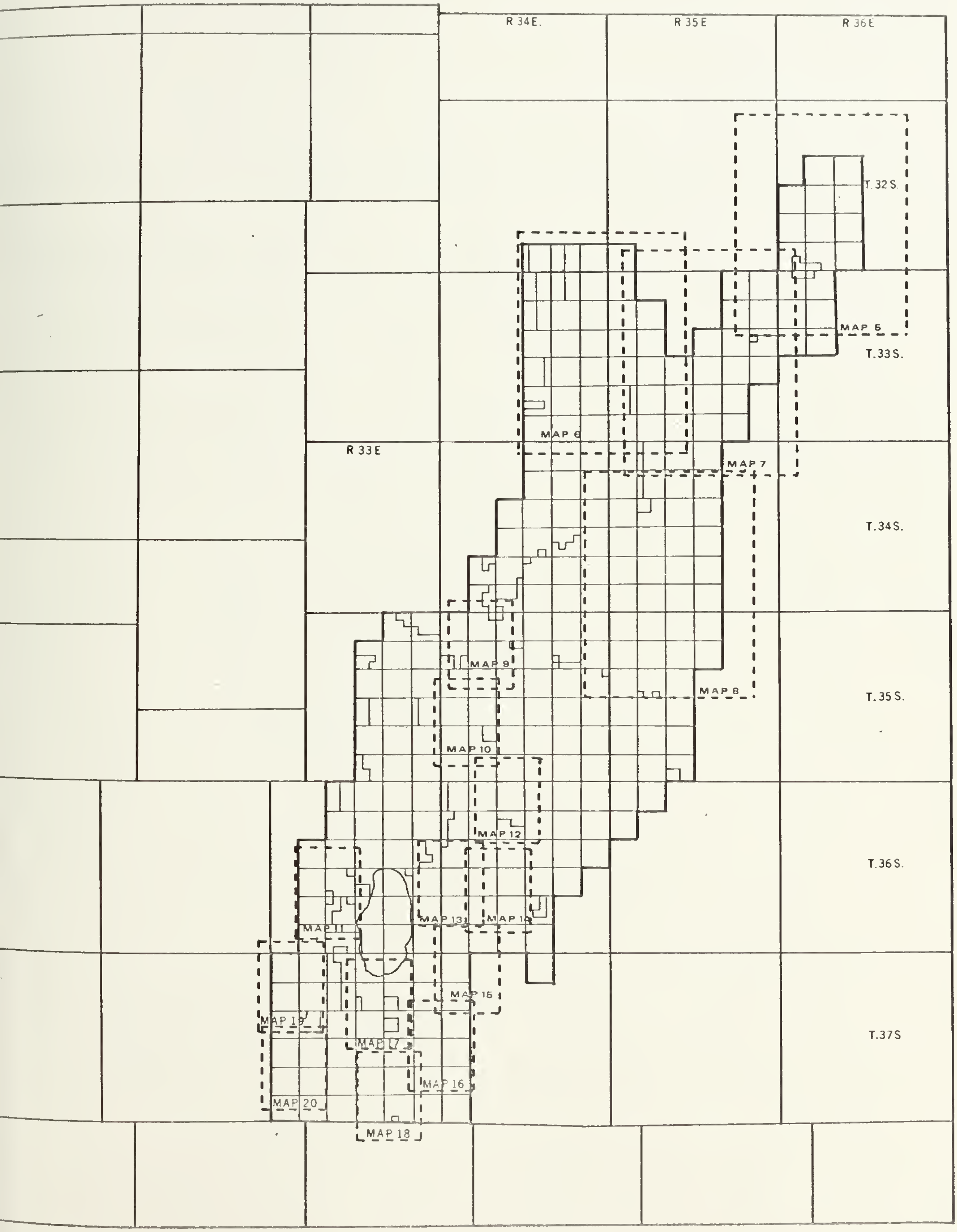
MAP 2. ENVIRONMENTAL ZONES IN PROJECT AREA


R 34 E.
T. 32 S.
ENVIRONMENTAL ZONE 1 - PLAYA BOTTOM
ENVIRONMENTAL ZONE 2 - PLAYA BOTTOM WITH ISOLATED HILLOCKS
ENVIRONMENTAL ZONE 3 - DUNE AND HILLOCK TOPOGRAPHY
ENVIRONMENTAL ZONE 4 - ALKALI FLATS
ENVIRONMENTAL ZONE 5 - LOWER STRANDS AND TERRACES
ENVIRONMENTAL ZONE 6 - UPPER STRANDS AND TERRACES
ENVIRONMENTAL ZONE 7 - UPLANDS
ENVIRONMENTAL ZONES 5 AND 6 (UNDIFFERENTIATED)

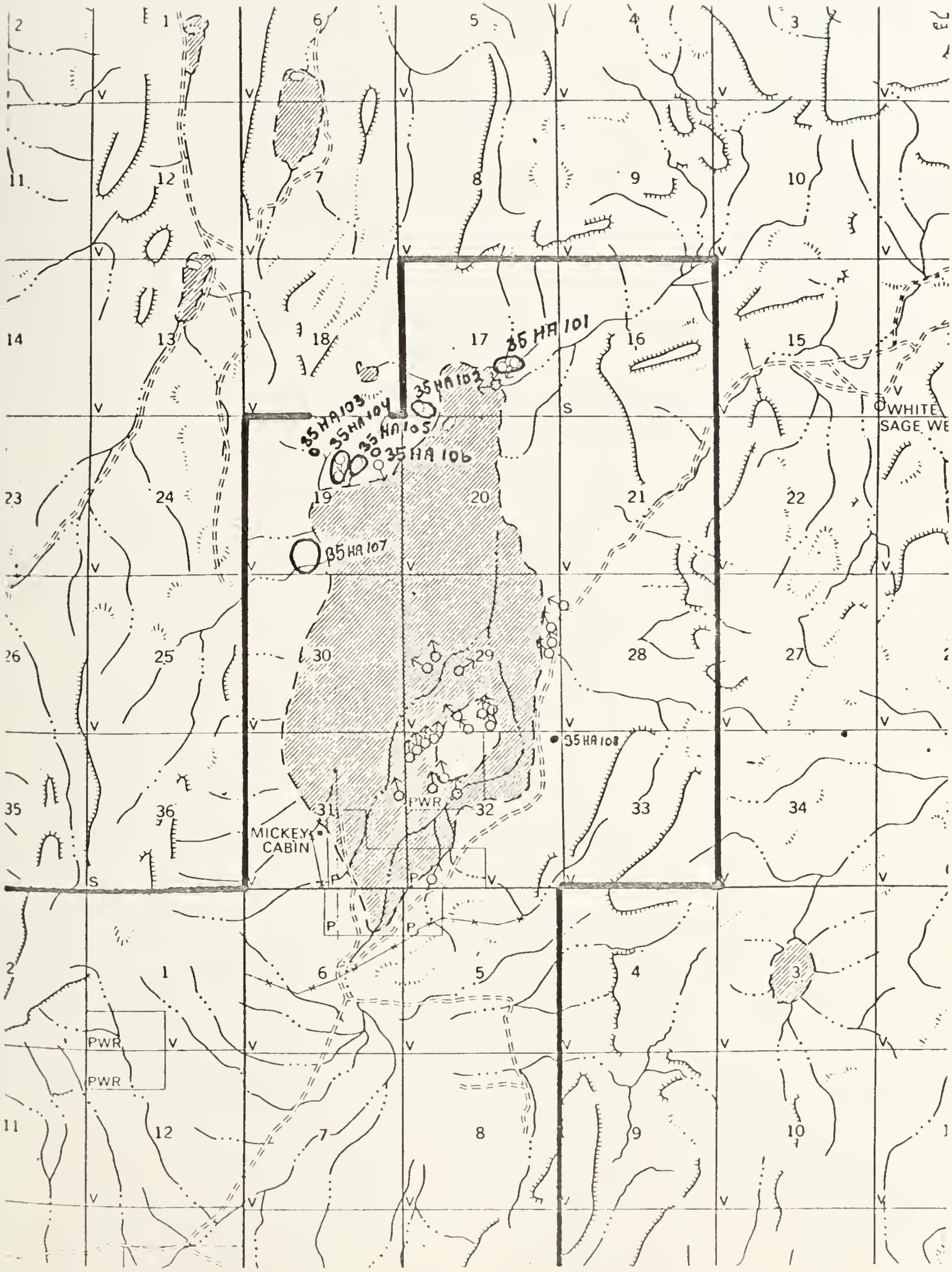
MAP 3. BLM LAND AND AREA SURVEYED WITHIN PROJECT AREA


R.34E.
T.32S
BLM LAND
SURVEYED AREA

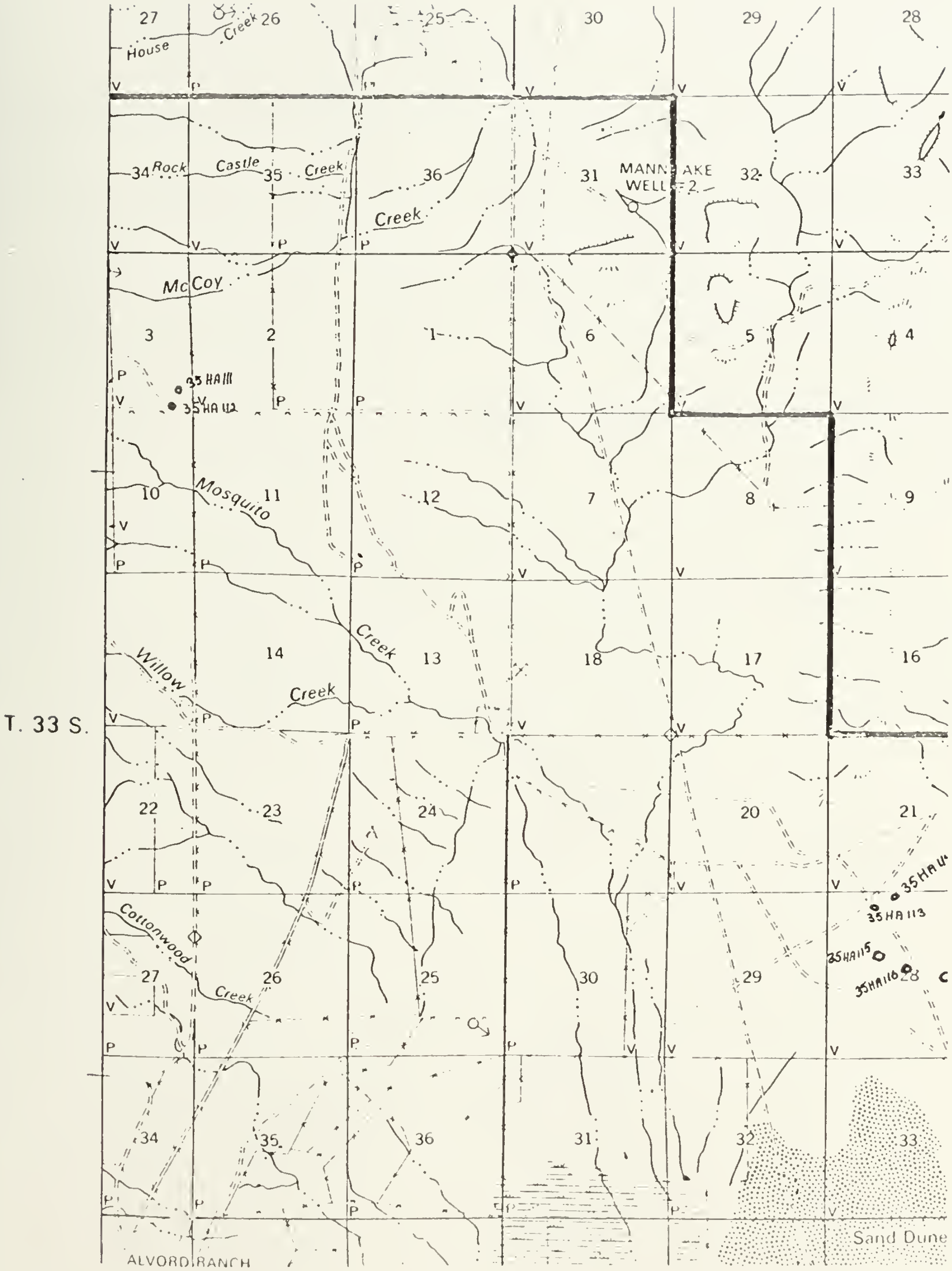
MAP 4. LOCATIONS OF MAPS 5-20


R 34E.
R 35E
R 36E
R 33E
T. 32 S.
T. 33 S.
T. 34 S.
T. 35 S.
T. 36 S.
T. 37 S
MAP 5
MAP 6
MAP 7
MAP 8
MAP 9
MAP 10
MAP 11
MAP 12
MAP 13
MAP 14
MAP 15
MAP 16
MAP 17
MAP 18
MAP 19
MAP 20

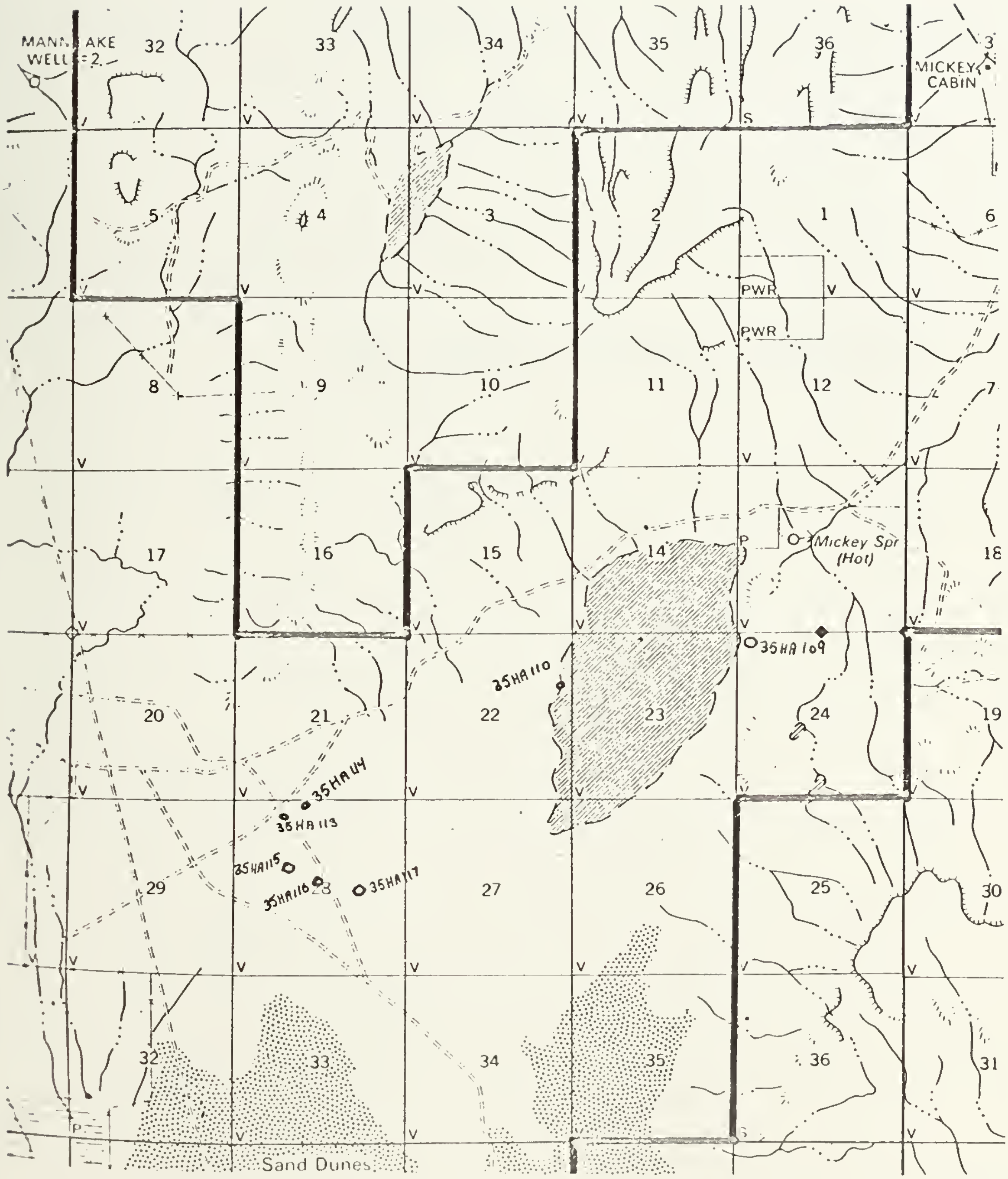
MAP 5. MICKEY LAKE AREA


35HA101
35HA102
35HA103
35HA104
35HA105
35HA106
35HA107
35HA108
MICKEY CABIN
WHITE SAGE WE
PWR
P
S
V
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

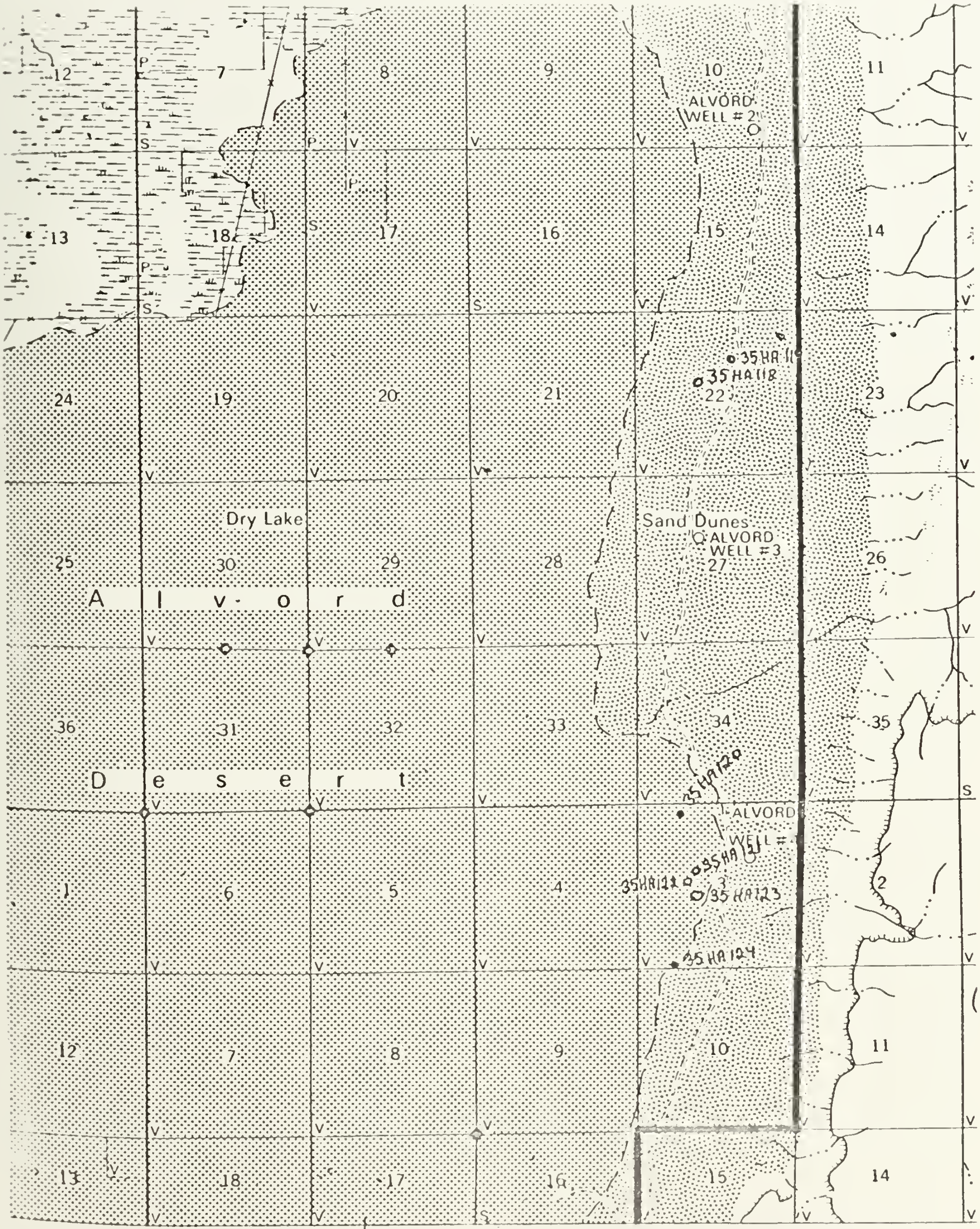
MAP 6. MOSQUITO CREEK AREA


T. 33 S.
House Creek
Rock Castle Creek
Creek
McCoy
MANN LAKE WELL #2
Mosquito Creek
Willow Creek
Cottonwood Creek
35HA111
35HA112
35HA113
35HA114
35HA115
35HA116
Sand Dune
ALVORD RANCH
27
26
25
30
29
28
34
35
36
31
32
33
3
2
1
6
5
4
10
11
12
7
8
9
14
13
18
17
16
22
23
24
20
21
27
26
25
30
29
28
34
35
36
31
32
33
V
P

MAP 7. MICKEY HOT SPRINGS AREA

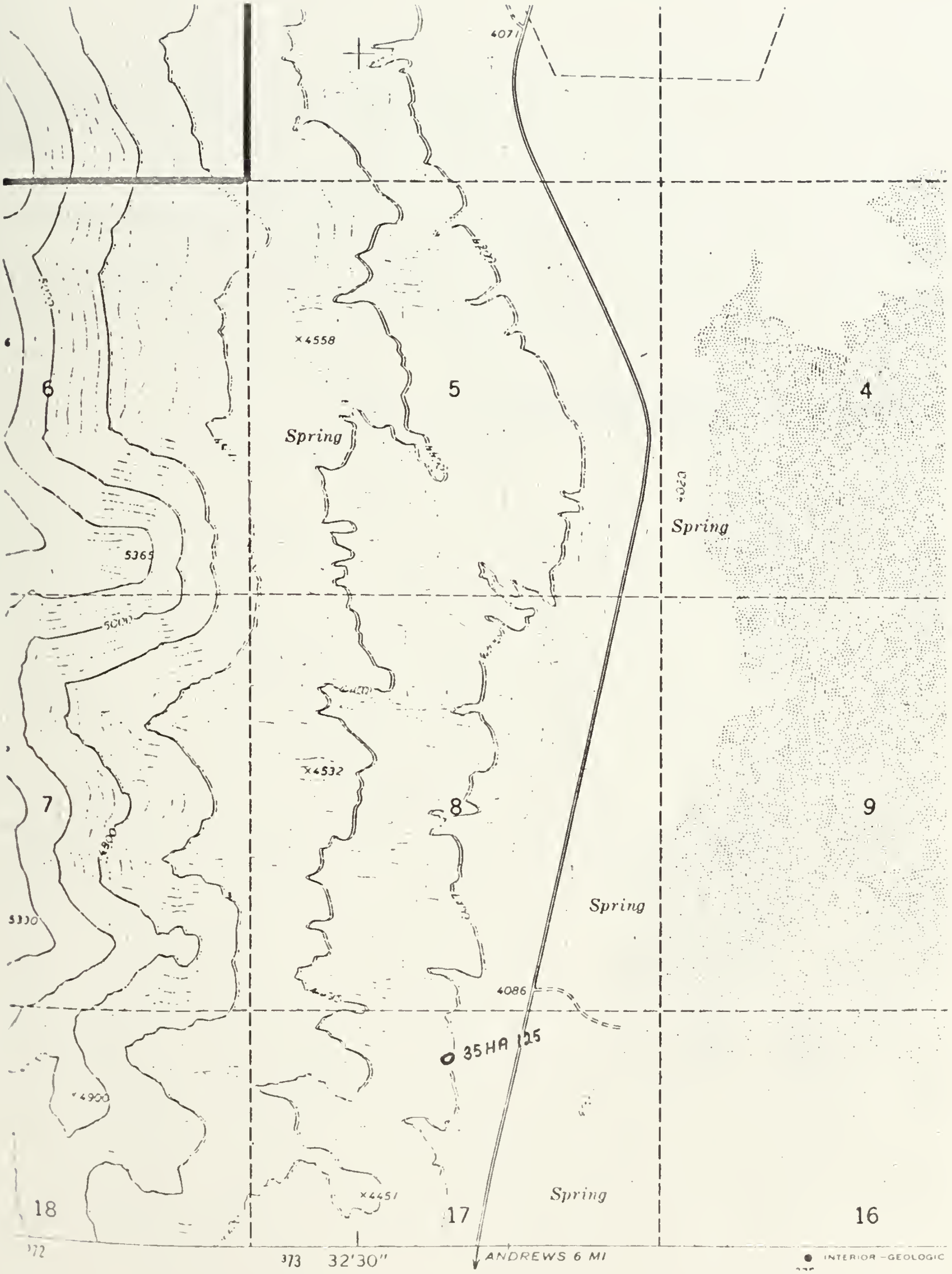

MANN LAKE WELL 2
32
33
34
35
36
MICKEY CABIN
5
4
3
2
1
6
PWR
PWR
8
9
10
11
12
7
17
16
15
14
Mickey Spr (Hot)
18
P
35HA109
35HA110
20
21
22
23
24
19
35HA114
35HA113
35HA115
35HA116
35HA117
29
28
27
26
25
30
32
33
34
35
36
31
Sand Dunes

MAP 8. NORTHEASTERN MARGIN, ALVORD DESERT

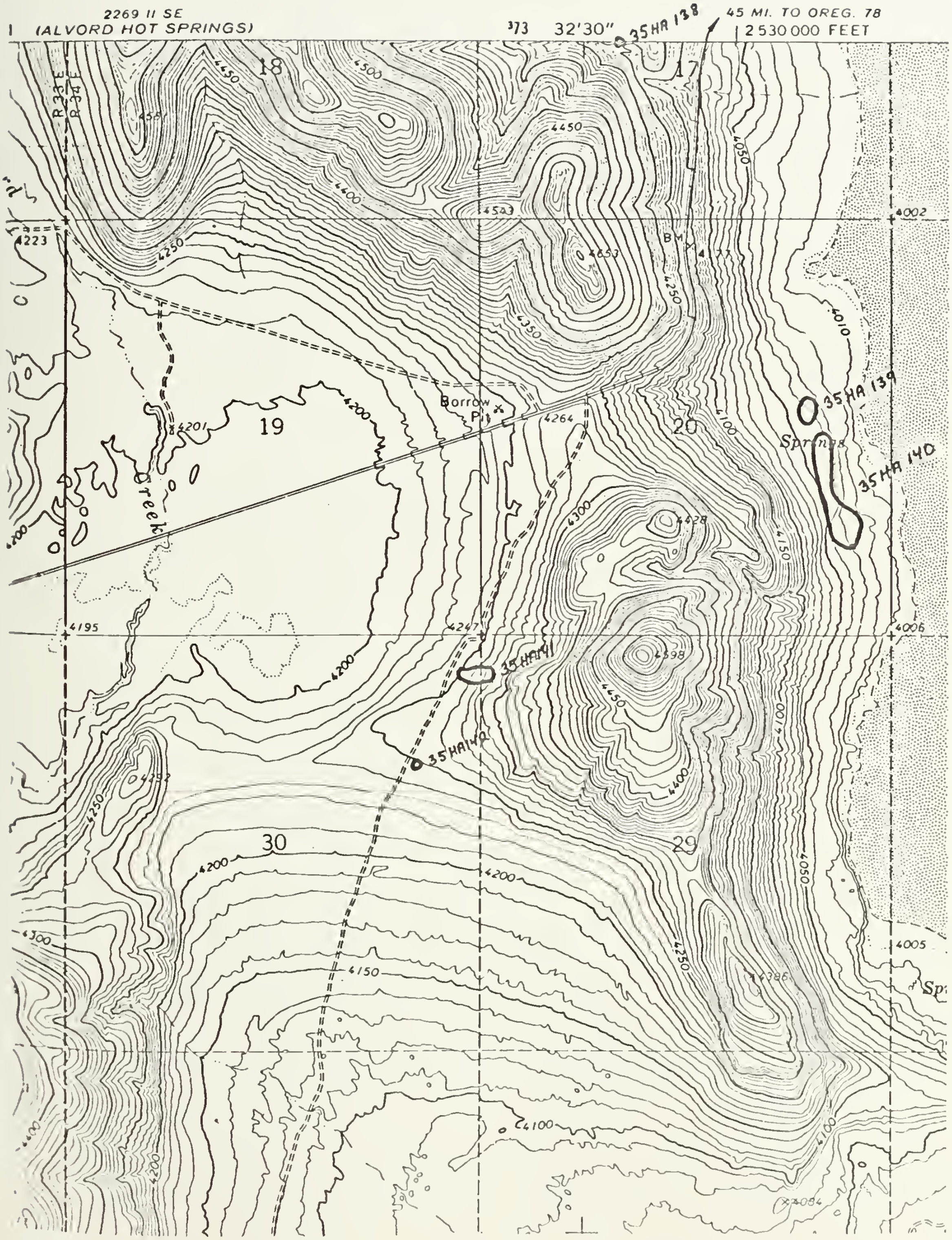

12
7
8
9
10
ALVORD
WELL #2
11
13
18
17
16
15
14
35HA11
35HA118
24
19
20
21
22
23
Dry Lake
Sand Dunes
ALVORD
WELL #3
25
30
29
28
27
26
Alvord
36
31
32
33
34
35
Desert
35HA120
ALVORD
WELL #1
35HA121
35HA122
35HA123
1
6
5
4
3
2
35HA124
12
7
8
9
10
11
13
18
17
16
15
14
P
S
V

R. 35 E.

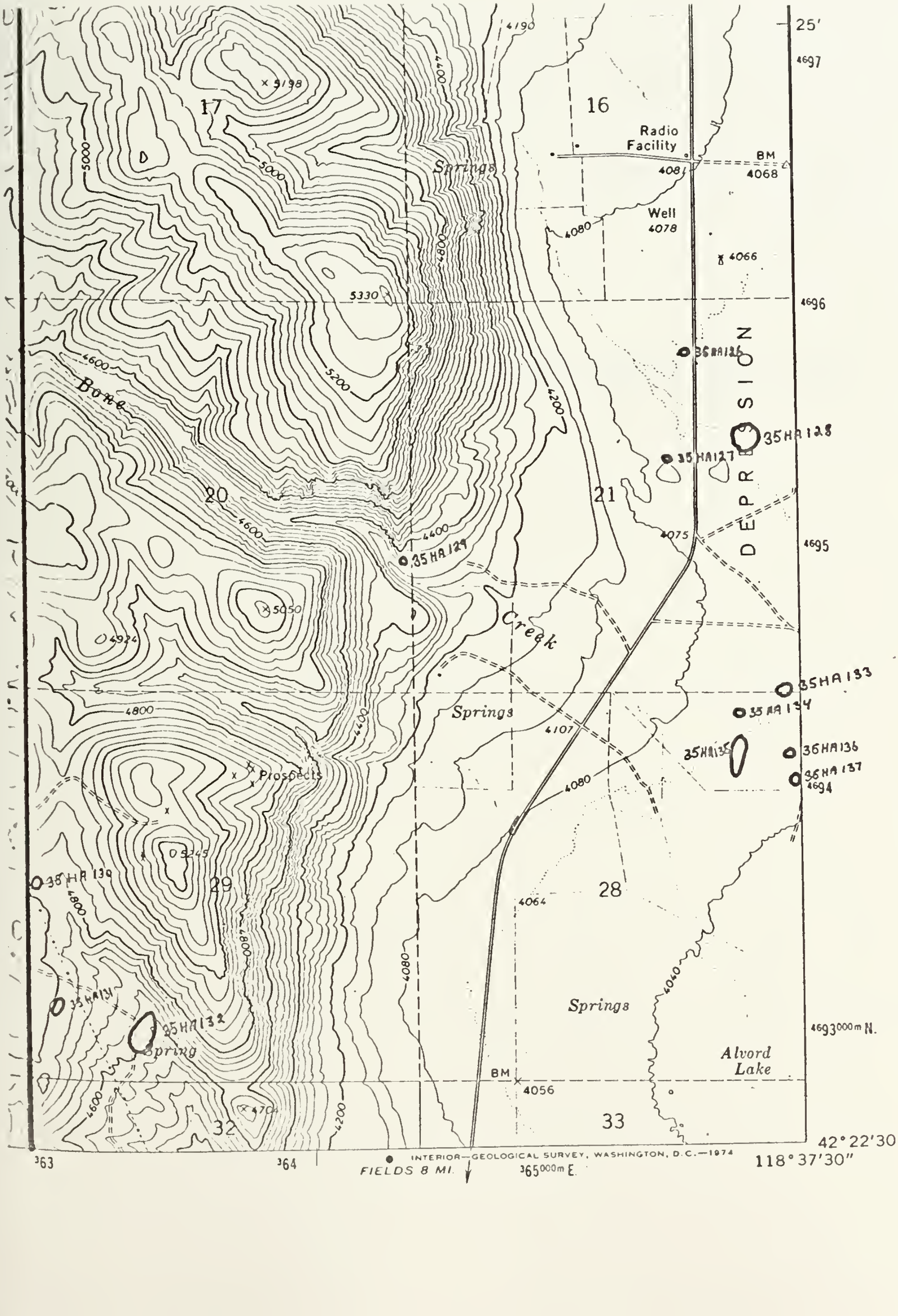
MAP 9. WESTERN MARGIN, ALVORD DESERT


4071
×4558
6
5
4
Spring
Spring
5365
5000
×4532
7
8
9
4900
5300
Spring
4086
35HA 125
×4900
×4451
Spring
18
17
16
372
373
32'30"
ANDREWS 6 MI
INTERIOR—GEOLOGIC

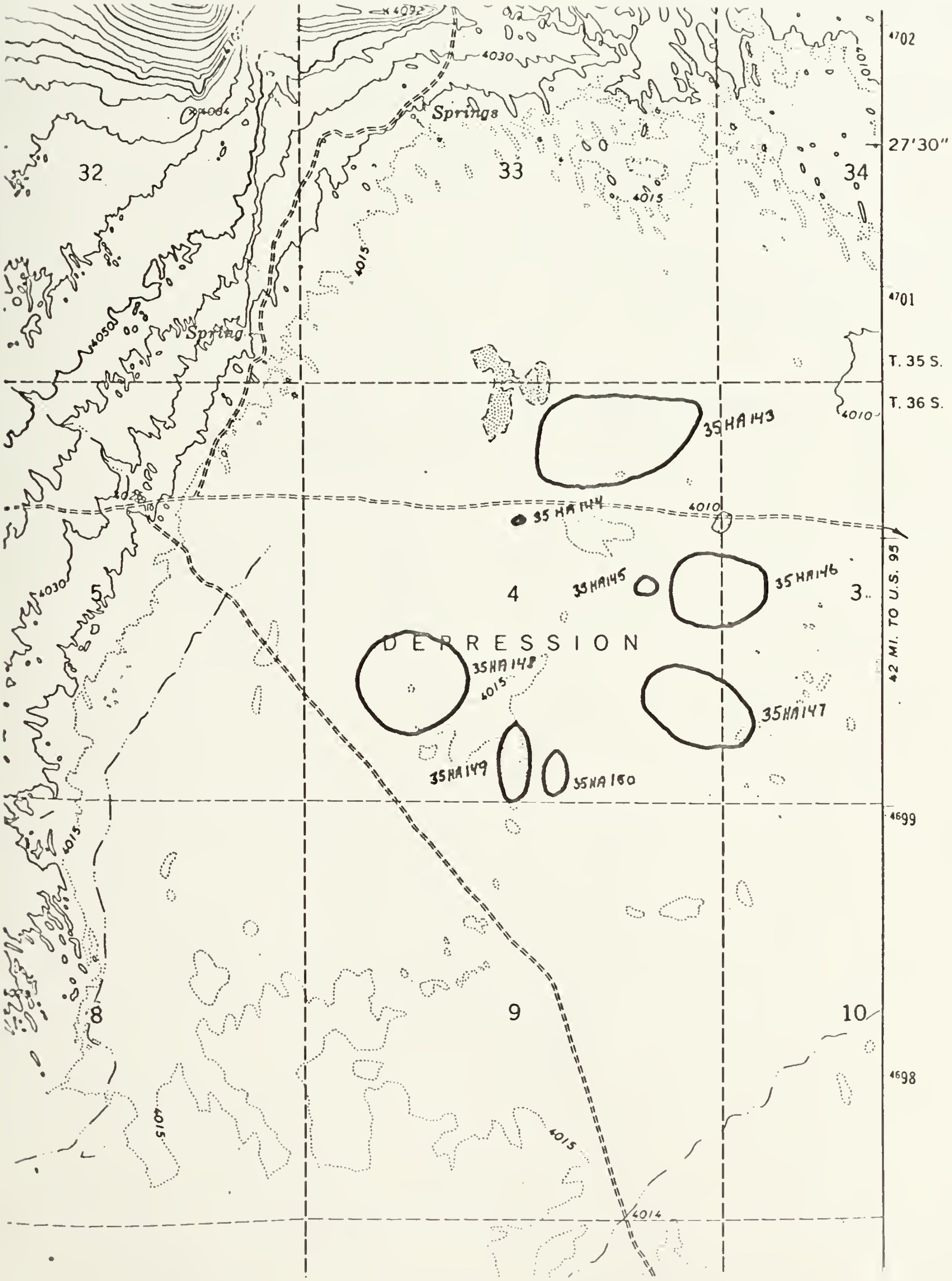
MAP 10. SOUTHWESTERN MARGIN, ALVORD DESERT


2269 II SE
(ALVORD HOT SPRINGS)
373
32'30"
35HA 138
45 MI. TO OREG. 78
2 530 000 FEET
R33E
R34E
18
17
19
20
29
30
4500
4450
4400
4250
4350
4543
4653
4223
4201
4200
4264
4247
4195
4428
4598
4650
4400
4300
4292
4150
4100
4050
4010
4002
4006
4005
4084
BM
Borrow Pit
Creek
Springs
35HA 139
35HA 140
35HA141
35HA142
Sp

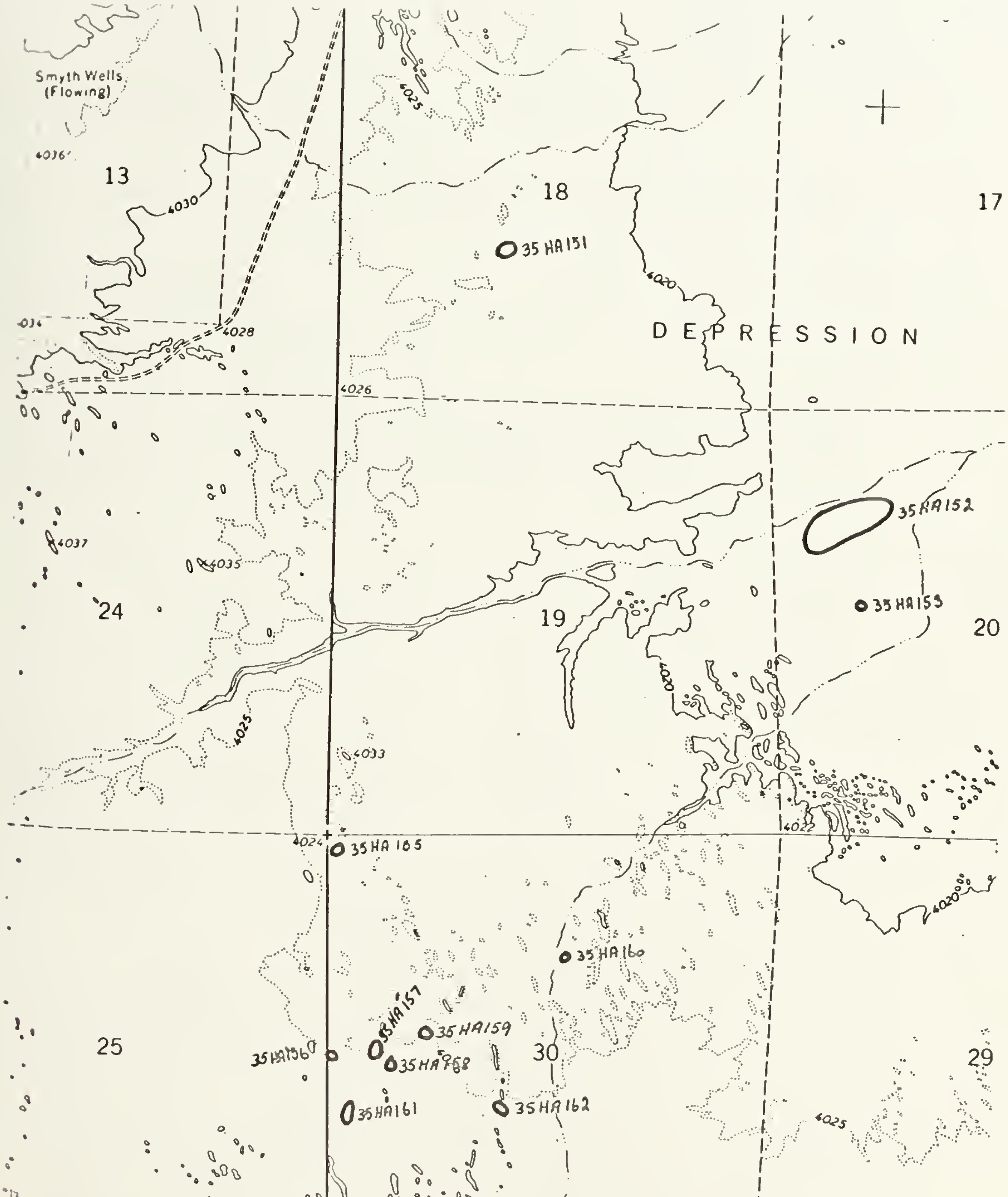
MAP 11. BONE CREEK AREA


25'
4697
16
17
Radio Facility
BM
4068
4081
Well
4078
4066
4080
4190
×5198
5000
Springs
4800
4400
5330
4696
35HA126
35HA127
35HA128
DEPRESSION
4600
Bone
Creek
5200
4200
20
21
4075
4695
35HA129
×5050
4924
35HA133
35HA134
35HA135
35HA136
35HA137
4694
Springs
4107
4080
Prospects
5245
29
28
35HA130
4064
4040
Springs
35HA131
35HA132
Spring
4693000m N.
Alvord Lake
BM
4056
4704
32
33
42°22'30
118°37'30"
363
364
365000m E.
FIELDS 8 MI.
INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1974

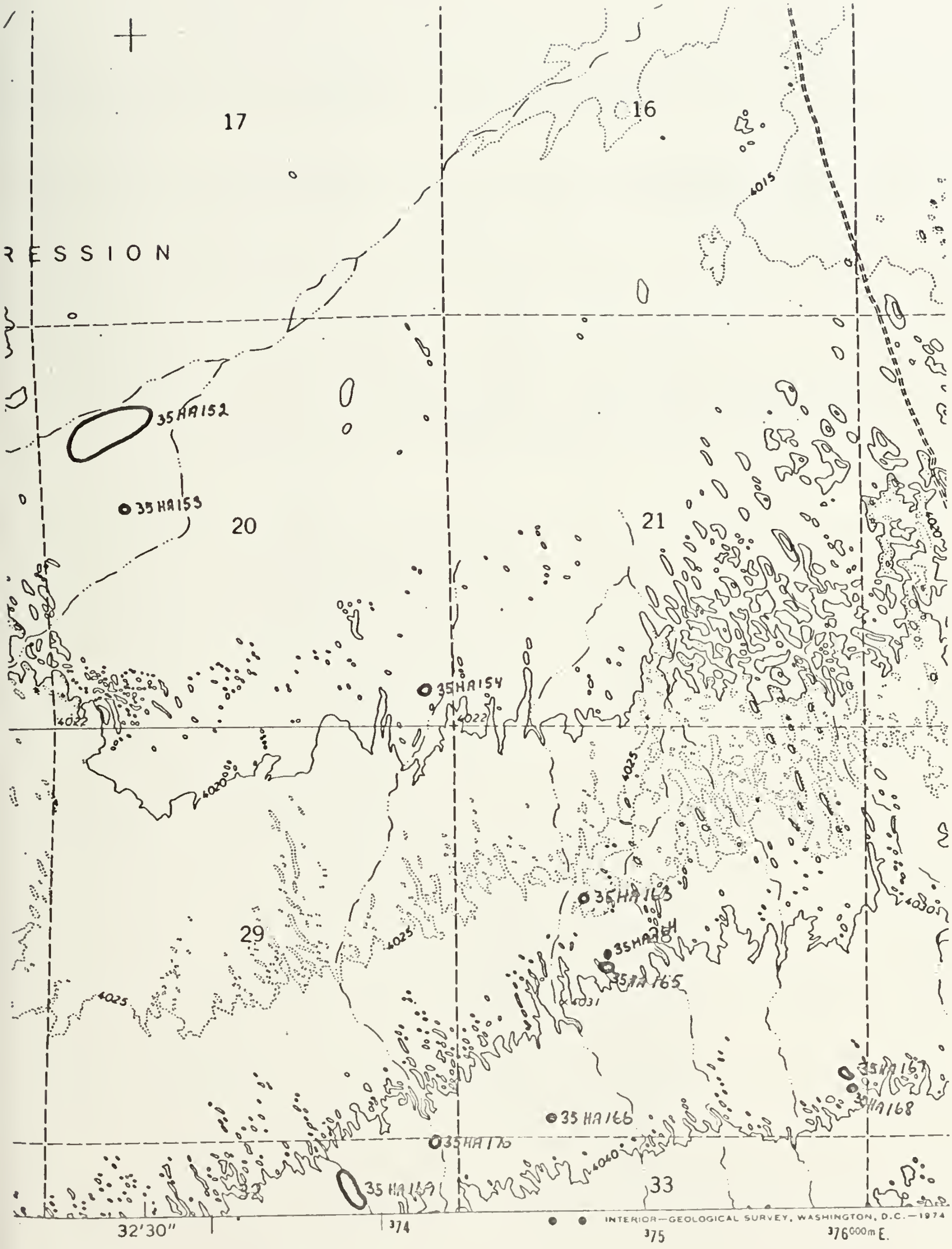
MAP 12. AREA SOUTH OF ALVORD DESERT


4092
4030
4064
Springs
32
33
34
4702
27'30"
4015
4015
4050
Spring
4701
T. 35 S.
T. 36 S.
4010
35HA143
35HA144
4010
5
4
3
4030
35HA145
35HA146
42 MI. TO U.S. 95
DEPRESSION
35HA148
4015
35HA147
35HA149
35HA150
4699
4015
8
9
10
4698
4015
4015
4014

MAP 13. SMYTH WELLS AREA

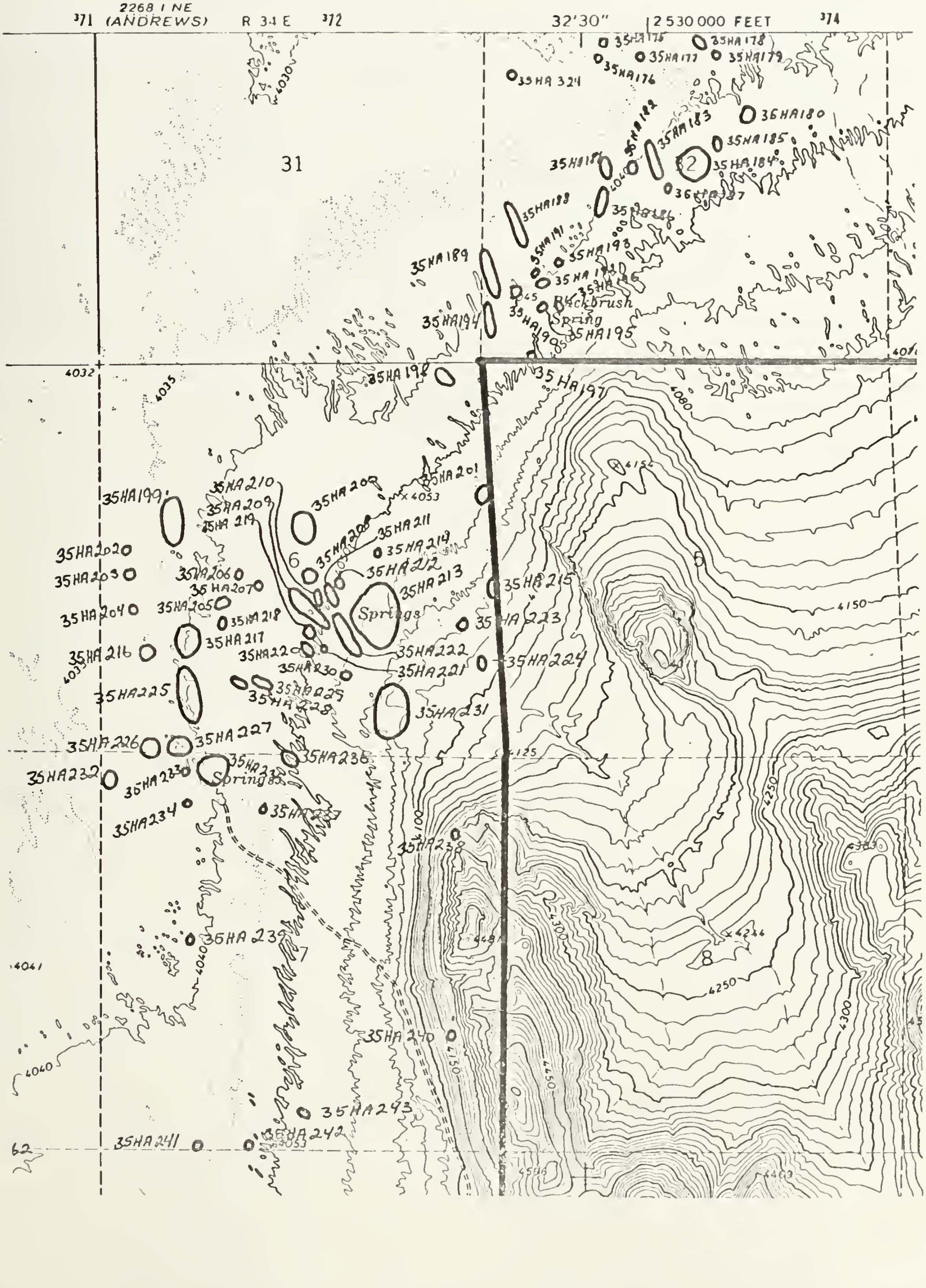

Smyth Wells (Flowing)
4036
13
4030
4034
4028
4026
4025
18
35HA151
17
4020
DEPRESSION
35HA152
35HA153
20
19
4020
24
4037
4035
4025
4033
4024
35HA165
4022
4020
35HA160
35HA157
35HA159
35HA156
35HA158
30
29
25
35HA161
35HA162
4025
4029
R33E
R34E
36
4030
31
32

MAP 14. AREA NORTH OF BUCKBRUSH SPRING

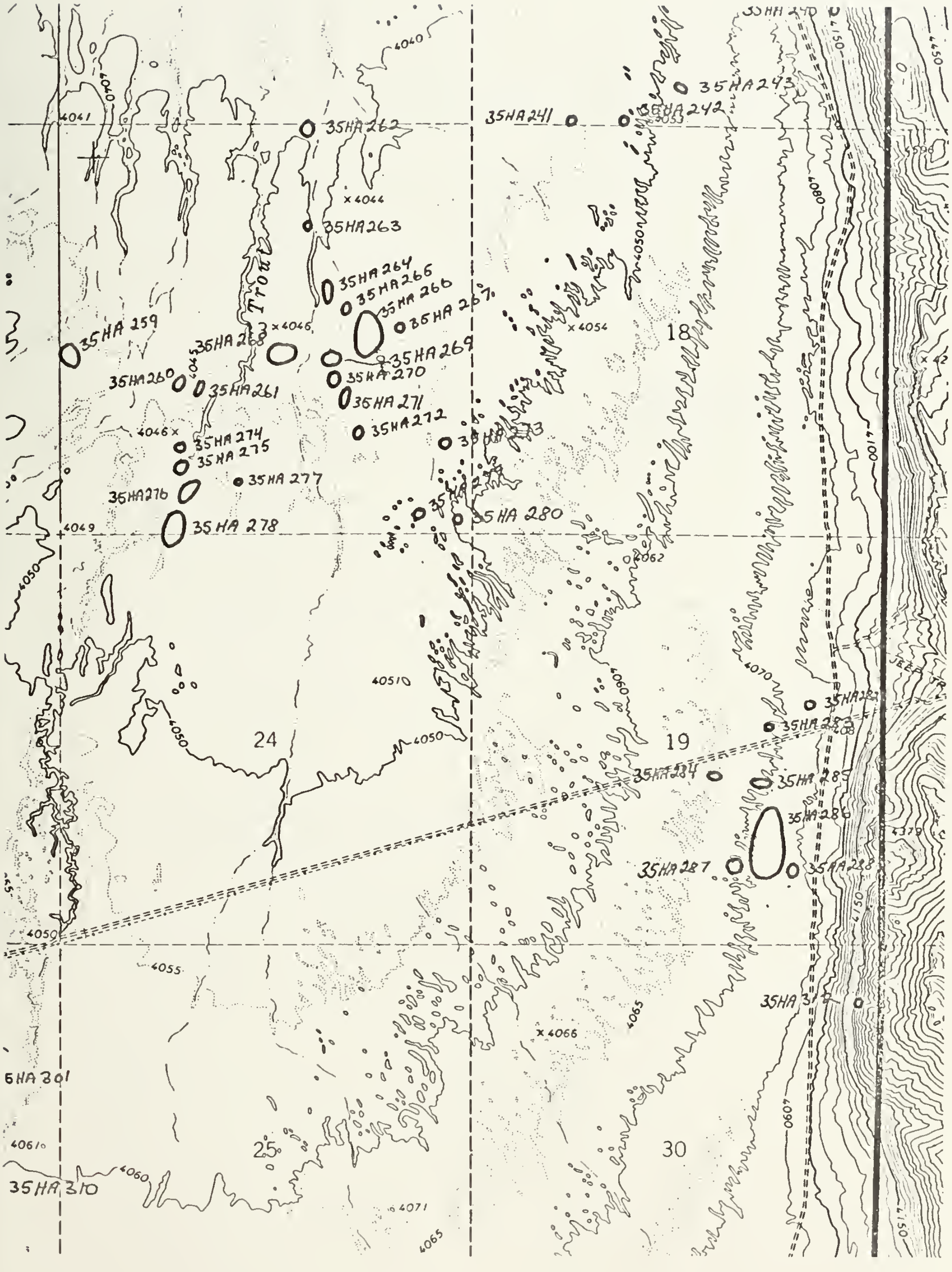


RESSION
17
16
4015
35HA152
35HA153
20
21
35HA154
4022
4022
4020
4025
35HA163
35HA164
35HA165
4031
29
4025
4025
4030
35HA166
35HA167
35HA168
35HA170
4040
35HA169
32
33
32'30"
374
375
376000m E.
INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1974

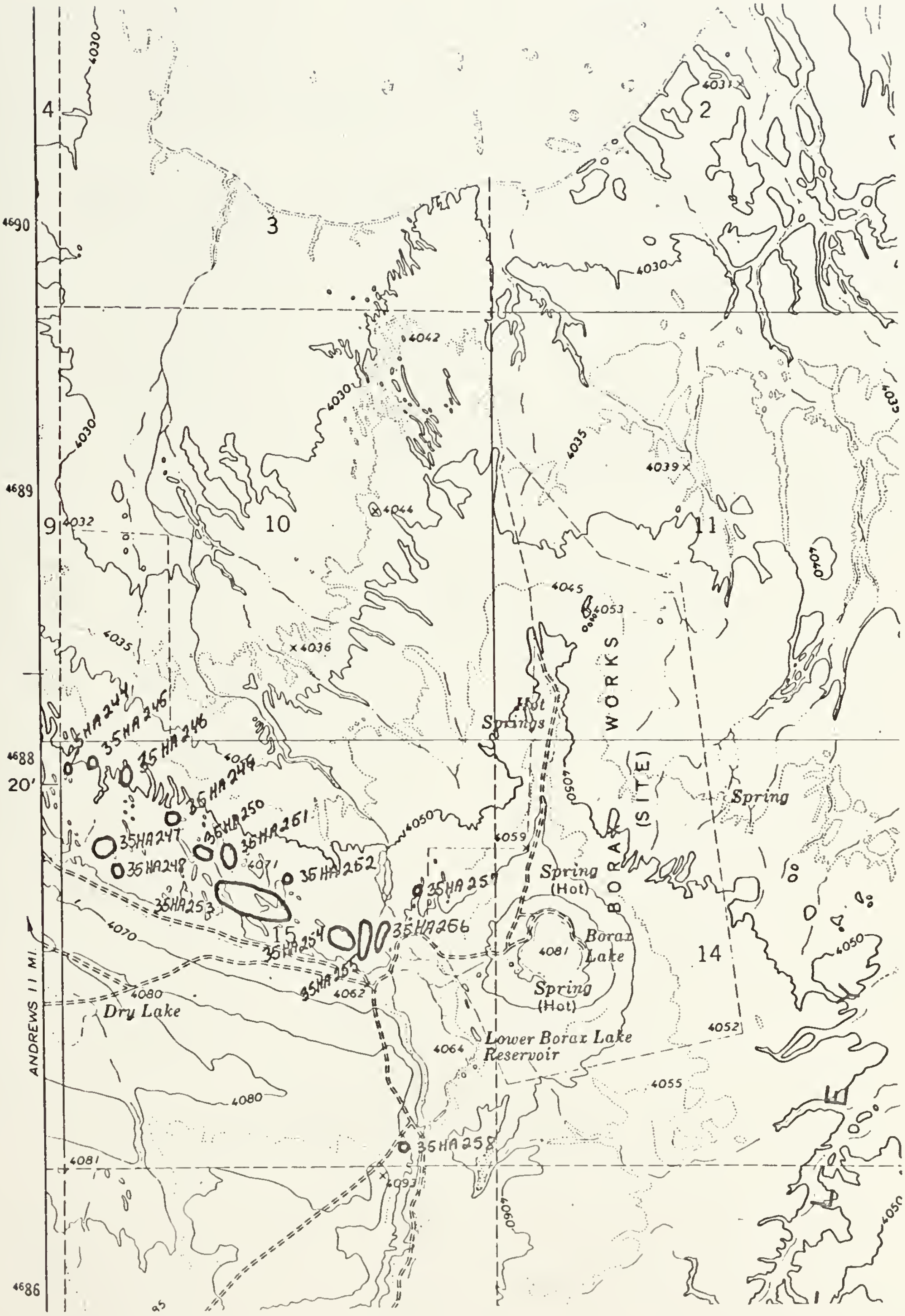
MAP 15. BUCKBRUSH SPRING AREA


2268 I NE
(ANDREWS)
371
R 34 E
372
32'30"
2 530 000 FEET
374
31
32
6
5
8
7
62
35HA175
35HA178
35HA177
35HA179
35HA176
35HA324
36HA180
35HA182
35HA183
35HA185
35HA184
35HA181
36HA187
35HA188
35HA186
35HA191
35HA193
35HA189
35HA190
35HA196
Blackbrush Spring
35HA194
35HA195
35HA198
35HA197
35HA192
35HA199
35HA210
35HA209
35HA219
35HA200
35HA201
35HA208
35HA211
35HA214
35HA212
35HA213
35HA202
35HA203
35HA204
35HA206
35HA207
35HA205
35HA218
35HA215
Springs
35HA223
35HA216
35HA217
35HA220
35HA222
35HA224
35HA221
35HA230
35HA229
35HA228
35HA225
35HA231
35HA226
35HA227
35HA236
35HA232
35HA233
Springs
35HA234
35HA237
35HA238
35HA239
35HA240
35HA243
35HA241
35HA242
4030
4032
4035
4040
4041
4053
4060
4080
4100
4125
4150
4154
4250
4244
4300
4303
4450
4483
4596
4603
4053

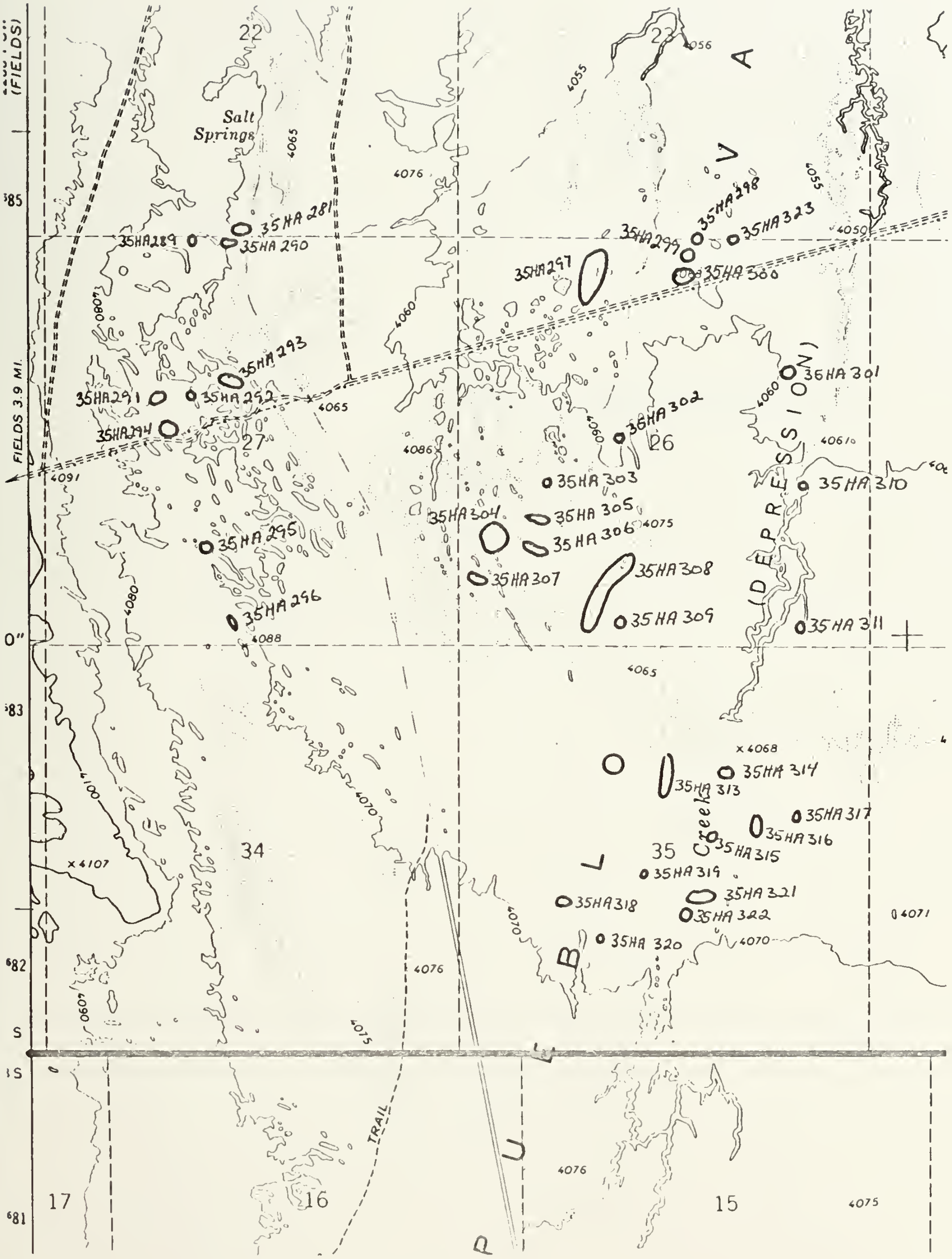
MAP 16. SAND GAP GUZZLER AREA


35HA 240
35HA243
35HA241
35HA242
4040
4041
35HA262
4053
x4044
35HA263
4050
35HA264
35HA266
35HA266
35HA267
Trout
x4046
x4054
18
35HA 259
35HA268
35HA269
4045
35HA270
35HA260
35HA261
35HA271
35HA272
4046 x
35HA274
35HA273
35HA275
35HA 277
35HA276
35HA 280
4049
35HA 278
4062
4050
4060
4070
40510
35HA283
35HA283
JEEP TR
24
19
35HA284
35HA285
35HA286
4379
35HA287
35HA288
4150
4050
4055
4065
35HA312
x4066
6HA301
4060
4061
35HA310
25
30
4071
4065
4150

MAP 17. BORAX LAKE AREA

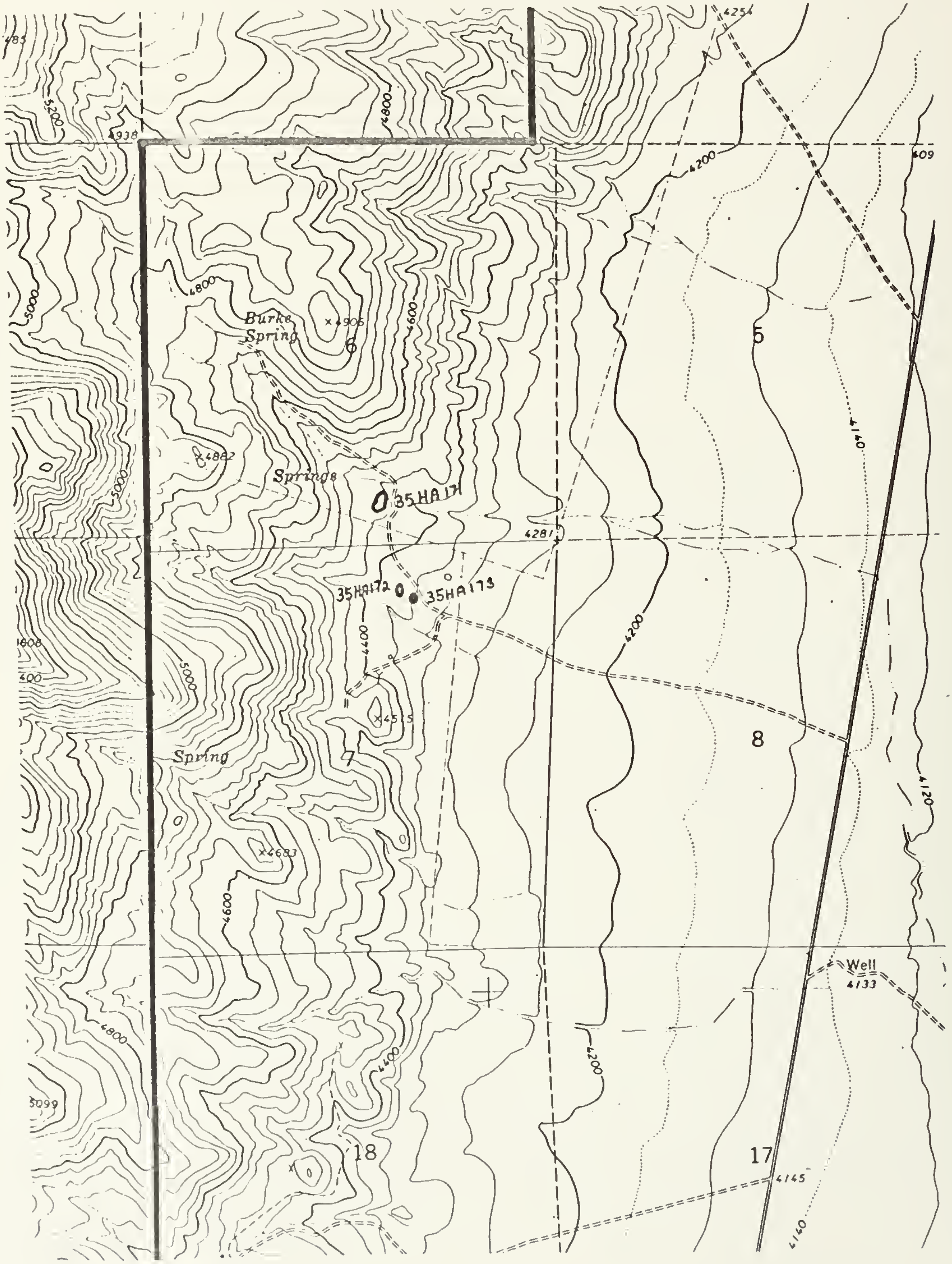

4
2
3
4030
4031
4690
4042
4030
4030
4035
4039 ×
4689
9
4032
10
4044
11
4040
4045
4053
4035
× 4036
Hot Springs
WORKS
(SITE)
BORAX
Spring
4688
20′
35HA244
35HA245
35HA246
35HA249
35HA250
35HA251
35HA247
35HA248
35HA252
35HA253
35HA257
35HA254
35HA255
35HA256
4071
4050
4059
4050
Spring (Hot)
Borax Lake
4081
Spring (Hot)
4070
15
4080
Dry Lake
4062
ANDREWS 11 MI.
14
4050
4052
Lower Borax Lake Reservoir
4064
4055
4080
35HA258
4081
4093
4060
4050
4686
95

MAP 18. SALT SPRINGS AREA


(FIELDS)
FIELDS 3.9 MI.
22
23
Salt Springs
35HA281
35HA289
35HA290
35HA291
35HA292
35HA293
35HA294
35HA295
35HA296
35HA297
35HA298
35HA299
35HA300
35HA301
35HA302
35HA303
35HA304
35HA305
35HA306
35HA307
35HA308
35HA309
35HA310
35HA311
35HA313
35HA314
35HA315
35HA316
35HA317
35HA318
35HA319
35HA320
35HA321
35HA322
35HA323
27
26
34
35
Creek
(DEPRESSION)
P U E B L O V A
TRAIL
17
16
15
4056
4055
4065
4076
4050
4060
4080
4091
4086
4061
4075
4088
4068
4110
4107
4070
4071
4090
585
0"
583
682
S
S
681

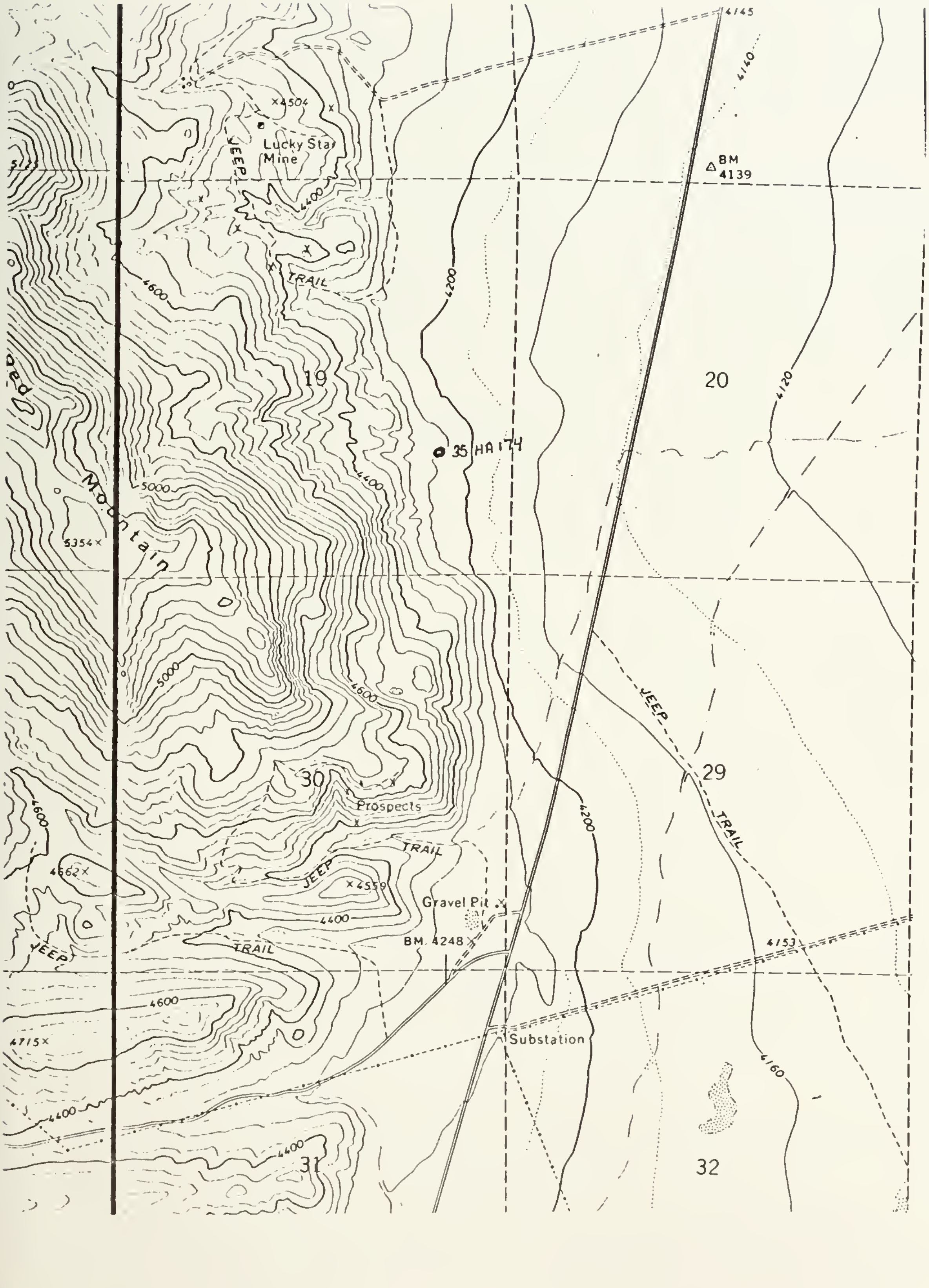
MAP 19. BURKE SPRING AREA

MAP 19. BURKE SPRING AREA



4251
4938
5200
4800
4200
409
Burke
Spring
×4906
6
5
4600
×4882
Springs
35HA171
4281
35HA172
35HA173
5000
4400
×4515
8
Spring
7
×4683
4120
Well
4133
5099
18
17
4145
4140

MAP 20. RED MOUNTAIN AREA


4145
4140
×4504
Lucky Star Mine
JEEP
BM 4139
4400
TRAIL
4600
4200
19
20
4120
35 HA174
4400
5000
Mountain
5354×
5000
4600
JEEP
29
TRAIL
30
Prospects
4200
4600
4562×
JEEP
TRAIL
×4559
Gravel Pit
BM. 4248
4400
JEEP
TRAIL
4153
4600
4715×
Substation
4160
4400
4400
31
32

PLATES

PLATE 1a. ENVIRONMENTAL ZONE 1--PLAYA BOTTOM
Mickey Lake Playa in middle, with site 35 HA 101 at spring at extreme left and site 35 HA 102 at spring in right center.

PLATE 1b. ENVIRONMENTAL ZONE 2--PLAYA BOTTOM
WITH SCATTERED HILLOCKS
View of 35 HA 146, looking east-northeast toward Serrano Point

PLATE 2a. ENVIRONMENTAL ZONE 3--DUNE AND HILLOCK TOPOGRAPHY
View of site 35 HA 253, looking north

PLATE 2b. ENVIRONMENTAL ZONE 4--ALKALI FLATS
View of site 35 HA 259, looking east

PLATE 3a. ENVIRONMENTAL ZONE 5--LOWER STRANDS AND TERRACES
View of site 35 HA 126, looking north

PLATE 3b. ENVIRONMENTAL ZONE 6--UPPER STRANDS AND TERRACES
View of site 35 HA 240, looking north

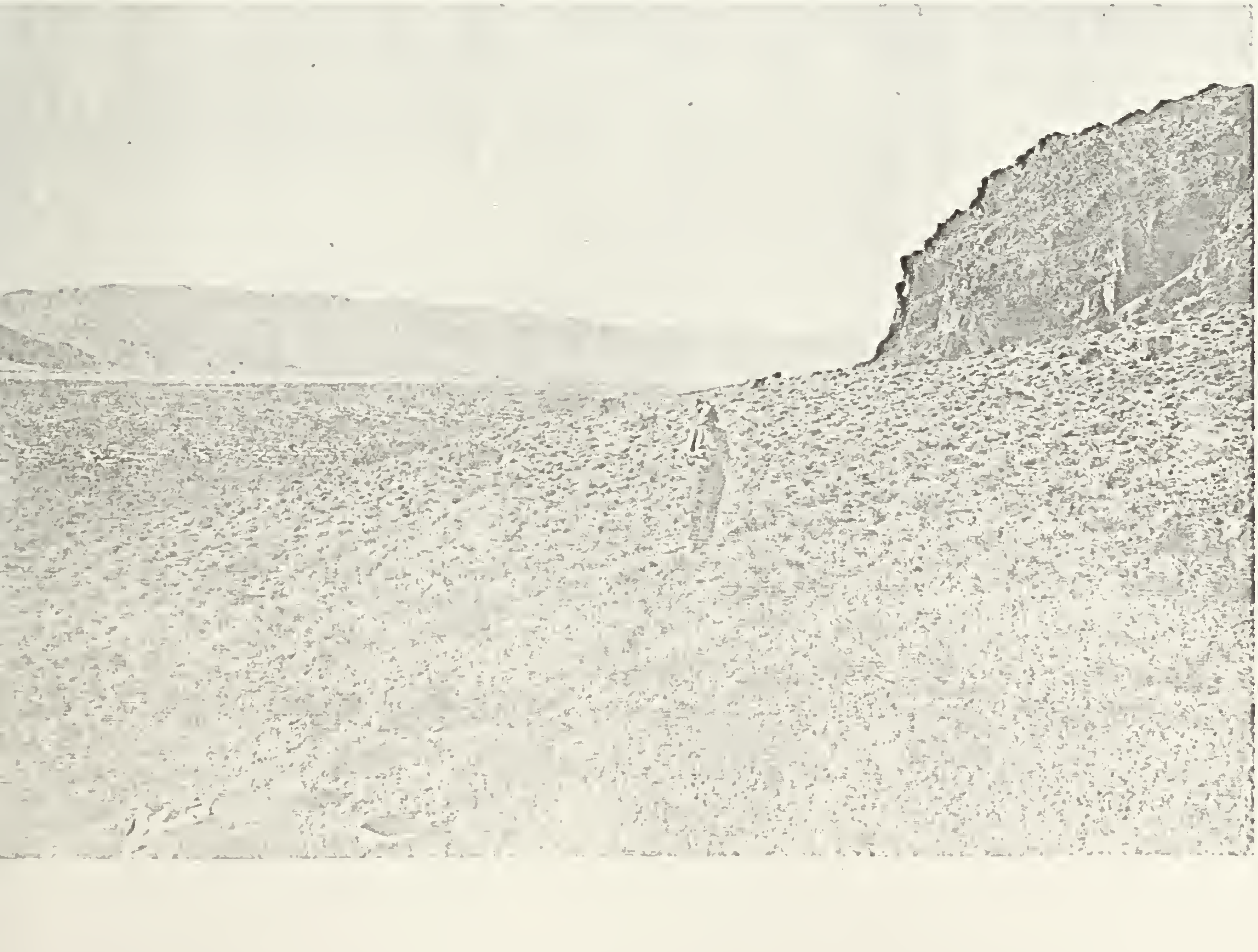


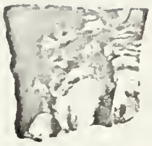
PLATE 4. ENVIRONMENTAL ZONE 7--UPLANDS
View of site 35 HA 132, looking southeast

PLATE 5. EARLY PROJECTILE POINTS

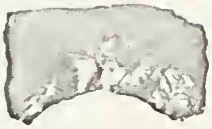
a-e. Fluted points
f-g. Haskett/Lake Mohave points
h. Windust point
i-l. Lind Coulee points

Actual size.

a



b



c

d

e

f

g

h

i

j

k

l

PLATE 6. FOLIATE AND PLANO-LIKE POINTS

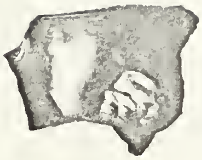
a.	Lind Coulee or leaf-shaped point
b-c.	Leaf-shaped points
d.	Alberta point
e.	Eden (?) point
f-j.	Scottsbluff (?) points
k-m.	Broad-based or stemmed points

Actual size.

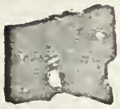
a

b

c

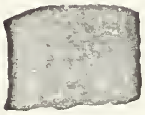

d

e


f

g

h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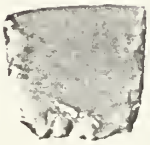

j

k

l

m

PLATE 7. ELKO EARED POINTS

Actual size.

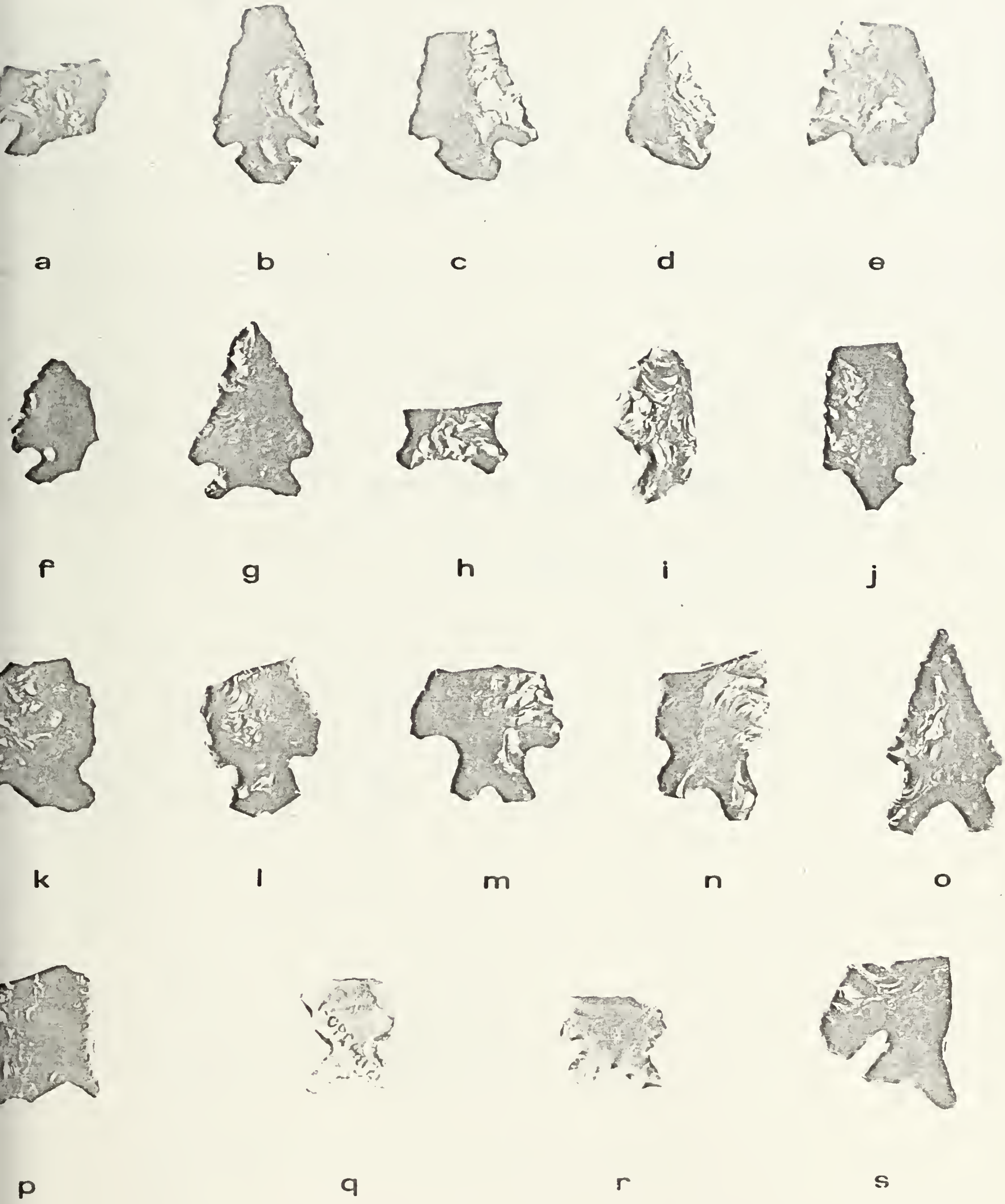
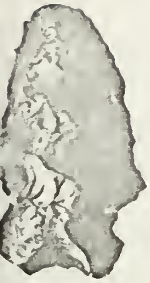
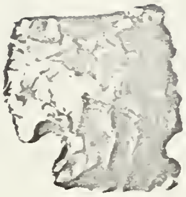

a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s

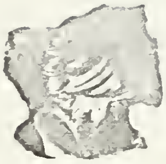
PLATE 8. BITTERROOT AND DESERT SIDE-NOTCHED POINTS

a-l. Bitterroot Side-notched points
m-q. Desert Side-notched points

Actual size.


a


b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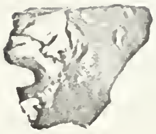
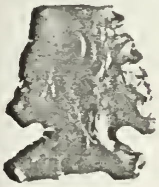

d

e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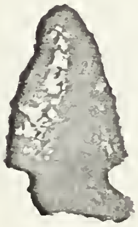
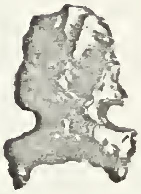

g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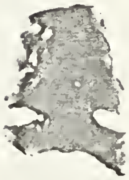
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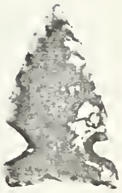
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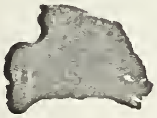
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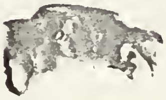
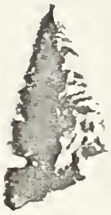

l

m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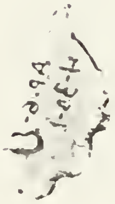
o


p

q

PLATE 9. PINTO SERIES POINTS

Actual Size.

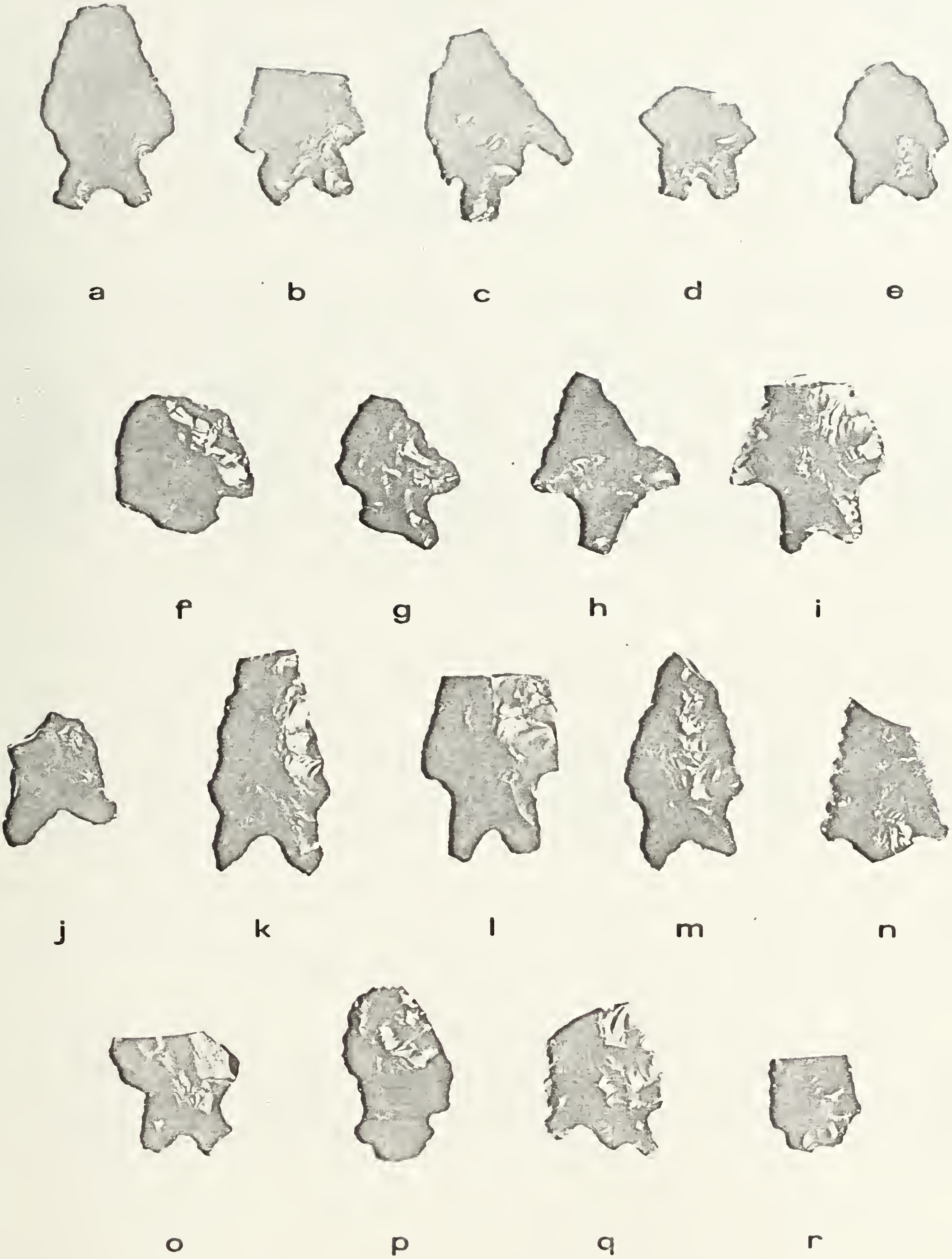

a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r

PLATE 10. ELKO CORNER-NOTCHED POINTS

Actual size.

a

b

c

d

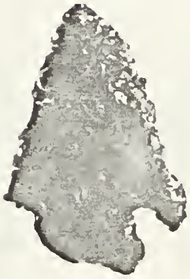
e

f

g

h

i



j

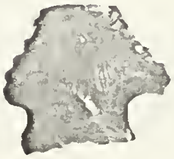
k

l

m

n

o



p

q

r

s

t

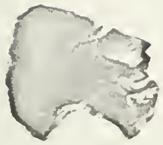
u

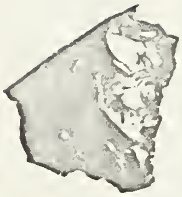
v

w

PLATE 11. HUMBOLDT CONCAVE BASE OR BASE-NOTCHED POINTS

Actual size.


a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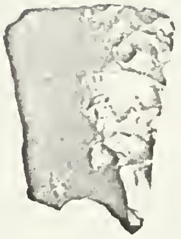
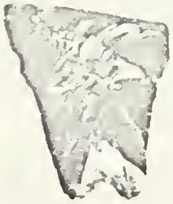

c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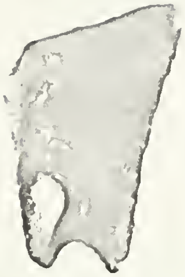
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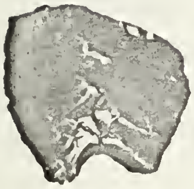
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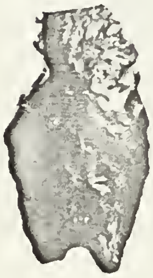
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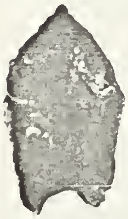
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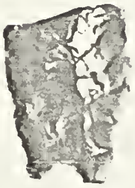
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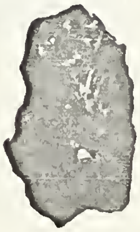
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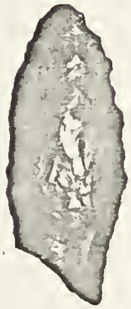
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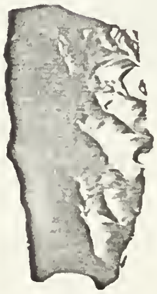
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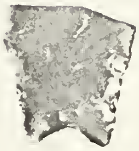
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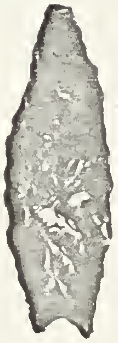
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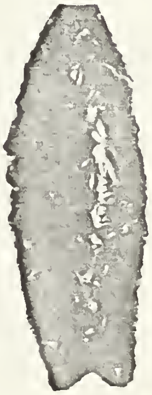
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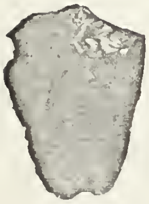
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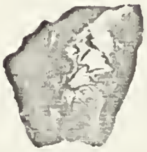
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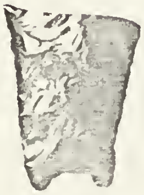
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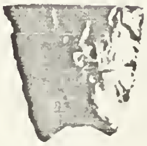
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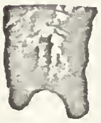
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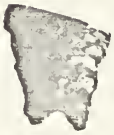

v

PLATE 12. HUMBOLDT CONCAVE BASE OR BASE-NOTCHED POINTS AND CRESCENTS

a-i. Points
j-s. Crescents

Actual size.

a

b

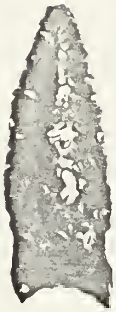
c

d

e

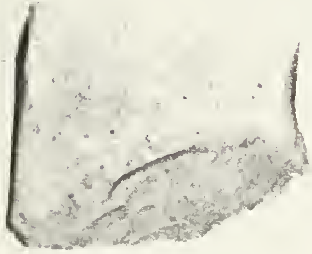
f

g


h

i

j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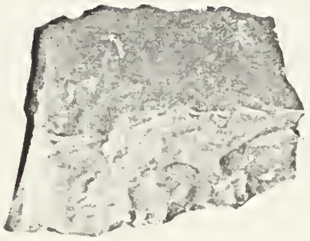
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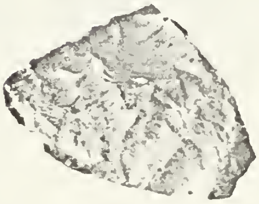
m

n

o

p

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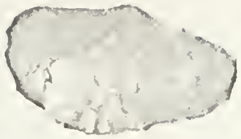
s

PLATE 13. CRESCENTS AND EASTGATE EXPANDING STEM POINTS

a-n. Crescents
o-t. Eastgate Expanding Stem points

Actual size.

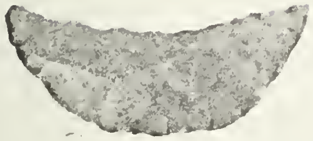
a



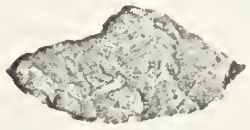
b

c

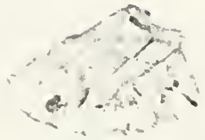
d



e



f



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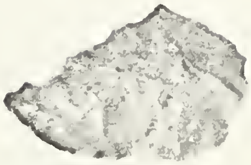

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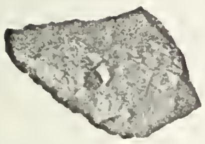

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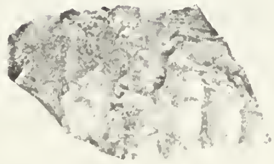

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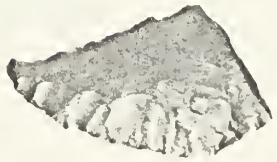
k



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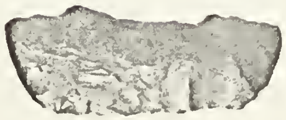

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PLATE 14. ROSE SPRING CORNER-NOTCHED POINTS

Actual size.

PLATE 14. ROSE SPRING CORNER-NOTCHED POINTS

Actual size.

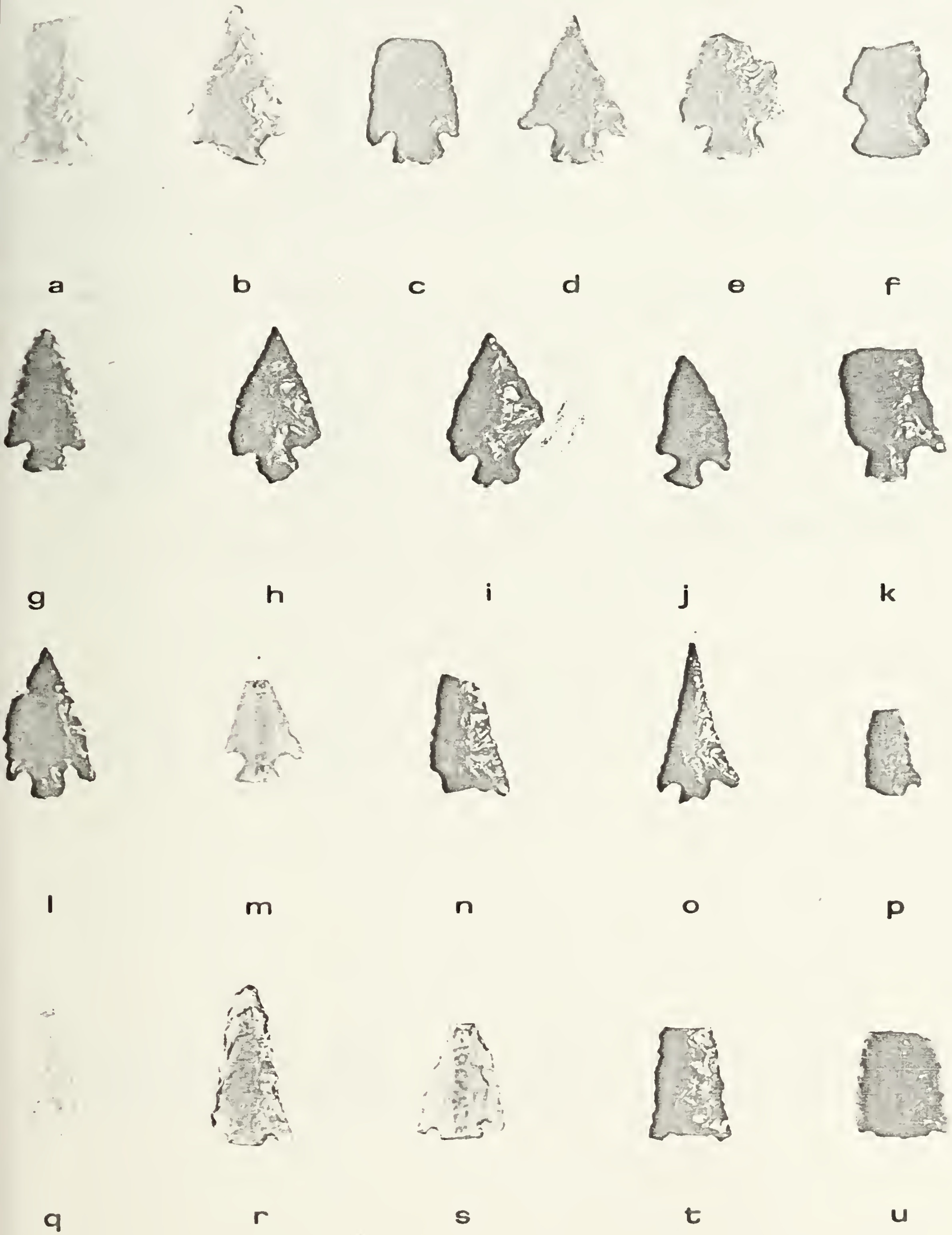
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PLATE 15. ROSE SPRING CORNER-NOTCHED POINTS

Actual size.

a

b

c

d

e

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h

i

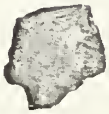
j

k

l

m

n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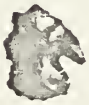
p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